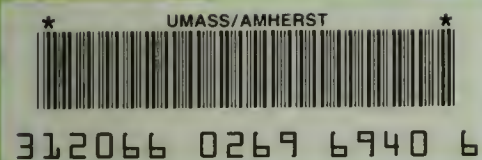


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DOCUMENTATION OF THE DEVELOPMENT OF THE NOVEMBER 14, 1981
ENTRY LEVEL POLICE SERVICES EXAMINATION
FOR THE COMMONWEALTH OF MASSACHUSETTS

GOVERNMENT DOCUMENTS
COLLECTION

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ABSTRACT

This report documents the test development and validation for the Police Services Examination administered on November 14, 1981. The examination instrument (the written test) is supported by criterion-related, content and construct validation evidence. The examination tested the same areas that were tested by the October, 1975 Police Services Examination (developed by the International Personnel Management Association-IPMA). Since the October, 1975 Police Services Examination was found to be highly predictive (unadjusted correlation coefficient $r = .49$, p less than .001; adjusted $r = .71$, p less than .001) of Police Academy training grades and since the November, 1981 Police Services Examination is based on the 1975 Police Services Examination and is strongly correlated with the 1975 examination (raw score correlation $r = .71$), the 1981 Police Examination is a valid selection instrument. Also, the 1981 Police Services Examination is based upon the content validity study performed in the development of 1979 Police Services Examination. That content validity study confirmed that the IPMA areas were content valid and indicated two additional testable areas which should be considered for inclusion in future examinations. The areas included in the 1979 Police Services Examination were the 1975 (IPMA) examination areas supplemented by experimental sections testing the two additional areas (these experimental sections did not contribute to the civil service exam grades for this examination.) The same areas comprised the 1981 Police Services Examination.

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FOREWORD

This report has been in existence in draft form for several months. Portions of it have been in draft form for over a year. It has been edited and published at this time as part of our documentation of public safety examinations. The report is intended to serve a heuristic purpose. For this reason it contains much more detail in some areas than would otherwise be appropriate. This report includes a detailed explanation of portions of the 1979 job analysis for the entry level police officer position because documentation of the 1979 content validity study is not available elsewhere.



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INTRODUCTION

The purpose of this report is to describe the various steps taken in the construction of the November 14, 1981 Entry Level Police Services Examination. This examination has long been one of the two largest civil service examinations in the state in terms of the number of applicants, the number of participating municipalities, and the number of persons hired as a result of the examination.

Approximately 5,000 applicants took the November 14, 1981 examination. Successful applicants may be eligible for appointment in approximately 170 civil service police departments in municipalities across the Commonwealth and several state agencies. This written test was designed to be used to determine the ranking of candidates applying for the position of police officer in such police departments.

The test development project was conducted by the Commonwealth of Massachusetts' Department (formerly Division) of Personnel Administration, the state's merit system agency. The test was designed to minimize adverse impact upon the hiring of minorities and to be a valid selection instrument pursuant to state and federal law and to an agreement made between the Commonwealth and the attorneys for the plaintiffs in the Castro vs. Beecher case (459 F2d 725), originally a class action discrimination suit against the Commonwealth (Castro et al., 1st Cir., 1972).

In 1975 the Division administered an entry-level police officer's examination (IPMA Form J:A-1(M)) to over 20,000 applicants. In 1978, the Division administered a test similar to the 1975 IPMA test. At about the same time a criterion-related validation study was begun. In 1979 another entry level examination was administered, the test development for which incorporated a comprehensive job analysis. The test development for the 1981 examination built on these earlier test development and validation efforts.

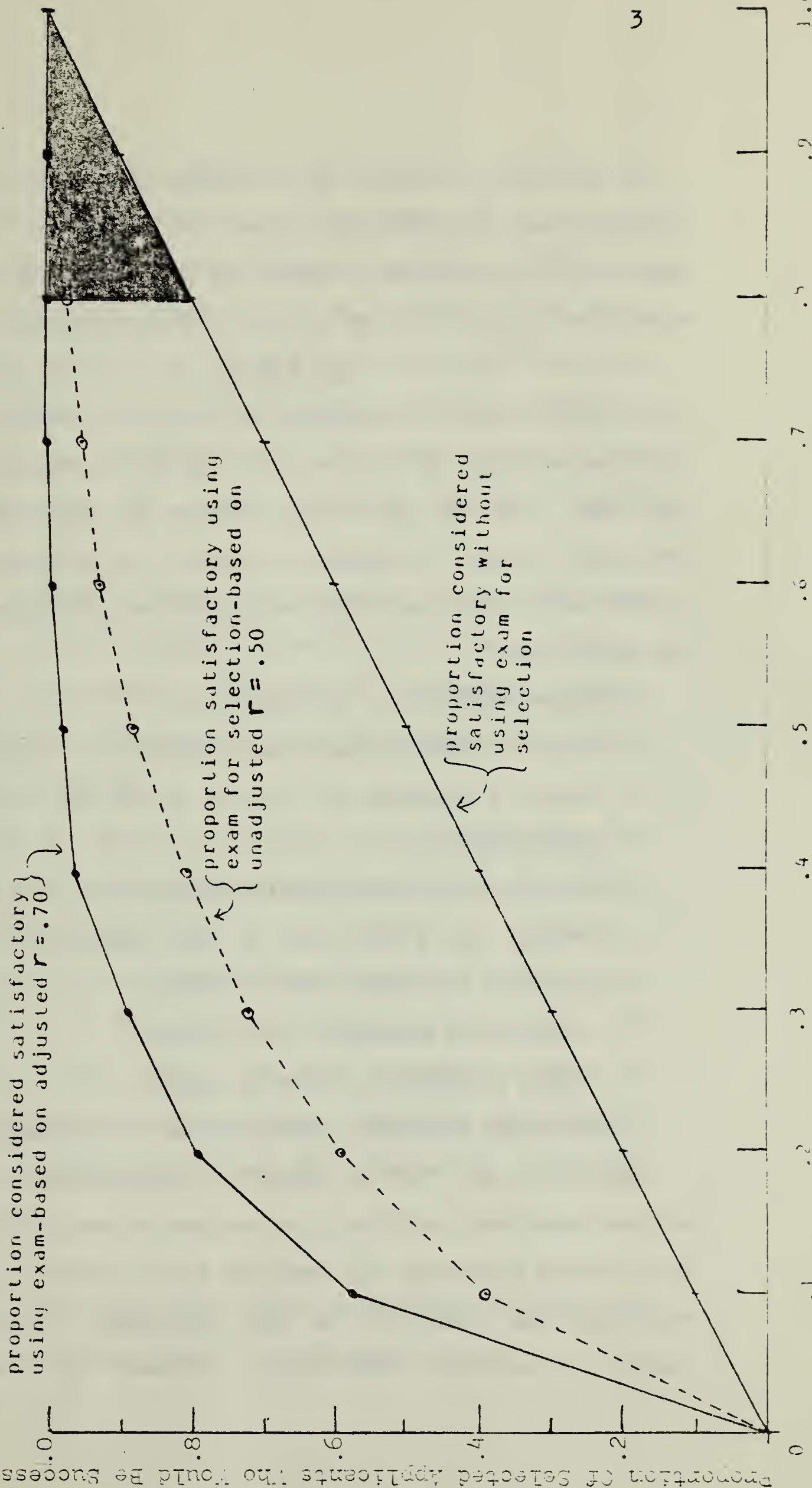
CRITERION-RELATED STUDY

The Division conducted a criterion-related study for the 1975 IPMA examination using a predictive validity methodology (Wiesen, Kita, Rice, Macdowall, Ashton and Garrity, 1982). The criterion used was job performance as measured by police academy grades. The grade on the 1975 IPMA test was the predictor. This study found that the 1975 IPMA was highly predictive of academic success, with a reported validity coefficient of .5 (uncorrected) and .7 (corrected).

A utility analysis performed as part of the criterion-related study demonstrated that if 50% of the applicants can do the job, then the failure rate without using the examination to screen applicants will be about 50%, while the failure rate using the examination will be about 2%. This is a very dramatic decrease in the failure rate of the new police officers. The failure rate is decreased by a factor of 25 by use of the examination. (See Figure 1).

Figure 1

Expected Increase In The Proportion Of Successful Candidates
As A Result Of Selection By The 1975 Examination, by Adjusted
And Unadjusted Validity Coefficients (selection ratio=.05)



On the basis of this criterion-related study, the professional literature and considerations related to the Castro vs. Beecher case, the Division decided to employ the IPMA test areas in the 1981 examination (as it did in the 1978 and 1979 examinations).

JOB ANALYSIS

The Division elected to strengthen its selection instrument for the 1979 examination by building on the criterion-related study and the IPMA areas. The 1979 job analysis and the test development is not described elsewhere. Therefore, a summary of selected steps is provided here. The major steps in the 1979 test development program were as follows:

1. Update the review of the literature.
2. Establish advisory committees to assist with project needs.
3. Conduct a statewide job analysis of the entry level police officer position.
4. Evaluate previous and identify potential new test areas.
5. Develop and pilot test a new examination (basically equivalent to the 1975 IPMA J:A-1(M)).
6. Translate the examination into Spanish.
7. Prepare a candidate orientation booklet.
8. Coordinate examination development with recruitment plans.

Experts in the field of industrial-organizational psychology, who have experience specifically in the area of personnel assessment and selection procedures, were employed by the Division to evaluate and suggest improvements to our test development procedures. Two separate consultants independently reviewed our examination

development process. They were C. J. Bartlett, Professor of Psychology, University of Maryland, and Bruce Davey, Chief Personnel Psychologist, Connecticut State Personnel Division. Evaluation, advice and guidance were requested from Dr. Bartlett in the early stages of the job analysis for the 1979 Police Services Examination and from Mr. Davey in the preparation for the 1978 examination. Their assistance was requested during the early stages of test development so that any suggestions could be most easily incorporated.

Mr. Davey endorsed a synergistic approach in which the three approaches to validity (content, criterion-related and construct) are used in a complementary and mutually confirmatory fashion, rather than the use of one approach to the exclusion of the others. This suggestion was adopted.

Dr. Bartlett was especially impressed with the methodology and results of the 1975 criterion-related study (Wiesen et al., 1982)*. He believed it was a sufficient base for supporting our endeavors on the 1979 Police Services Examination. He suggested that we place greatest emphasis on the criterion-related validity study, and continue with our job analysis and test development efforts to explore possible new test areas. These suggestions were accepted also. Both consultants felt that our examination development program was sound.

*Although published in 1982, this study was available in draft form at the time of the construction of the 1979 examination.

A critical element of this test development program was the job analysis (step 3). The job analysis was conducted by the Division during the Spring and Summer of 1979. The job analysis was conducted to determine whether the IPMA test measures abilities that are needed to perform important police officer work behaviors. Basically, the job analysis was conducted to determine whether the Division was in compliance with the Uniform Guidelines on Employee Selection Procedures (1978, especially sections 14C and 15C3), as well as to further a fundamental goal of the Division: to conduct valid and utilitarian civil service examinations. This job analysis focused on the work behavior(s) and the tasks associated with the behaviors. It identified critical or important work behaviors as stipulated in Section 14C and 14D2 of the Guidelines. In compliance with Section 14D2 of the Guidelines, the job analysis identified and defined each test area or construct believed to be related to the successful performance of the critical or important work behaviors. Furthermore, the criterion-related validity study conducted by the Division (Wiesen et al., 1982) provided support for the use of the IPMA constructs and test areas; thereby, complying with Section 14D2 of the guidelines.

Two committees assisted in this job analysis project; the Police Advisory Committee (consisting of 20 members representing various departments, unions and academy affiliated organizations), which provided guidance and assistance relative to the projects needs; and the Technical Advisory Committee (consisting of 6 division staff members with an understanding and familiarity with police selection), which provided technical judgements relative to the behavioral requirements necessary for job success.

The job analysis was accomplished in 4 steps: role-task identification, ability identification, role-ability linkage evaluation, and ability evaluation. The first step re-evaluated the role of the police officer in Massachusetts.

Role-Task Identification

Seven police roles were identified by the Division staff by combining the data from the Arthur D. Little (ADL) job analysis for the Criminal Justice Training Council (Morton, Wasserman and Hokanson, 1979) and an in-house analysis of 4 police department agencies not included in the ADL analysis (See Table A).

TABLE A

Seven Job Roles Of The Entry Level Police Officer*

<u>Role Number</u>	<u>Name of Role</u>
1.	Patrol
2.	Providing Services and Rendering Assistance
3.	Applying and Enforcing the law
4.	Investigating
5.	Assisting in Protection
6.	Documenting and Recording
7.	Miscellaneous

* After Morton et al. (1979)

The Division extended the ADL study to three agencies not considered by the ADL study. A group of 20 subject matter experts (SME's) reviewed the several job roles identified by the ADL study. These SME's rated the similarity between the job of entry level police officer in their four police agencies and the job description in the ADL Study to be 7.21, on average. This corresponds to a scale value (on an 8 point scale) of "Great Similarity". Based on the data (see Table B) and the comments of the SME's who served as raters, it was concluded that tasks performed by entry level police officers were basically the same across the Commonwealth.

TABLE B

Mean Rated* Similarity of the Statewide** Job
Description of Entry Level Police Officer with
the Job as it Exists in Three Additional
Police Departments, by Job Roles

<u>Police Departments</u>	<u>Job Roles</u>							Mean for all Roles
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	
Boston Police Department (N=4)	6.25	6.50	6.75	7.25	7.00	7.00	7.00	6.82
Capitol Police Force (N=4)	7.00	7.00	7.50	8.00	8.00	8.00	7.00	7.50
MBTA Police (N=2)	7.00	7.00	7.00	7.00	8.00	8.00	8.00	7.43
Total (N=10)	6.70	6.80	7.10	7.50	7.60	7.60	7.20	7.21

*Rating scale where ranged from a low of 1 to a high of 8.

**Morton et al. (1979)

Having confirmed the ADL task profile of the police officer's job in these three additional departments, the next phase of the study was to determine the important abilities required for job success.

Ability Identification

Since Rosenfeld and Thorton's research (1974) found that, in general, individuals who apply to become police officers do not have special training or experience in police work, the Division decided to focus upon measuring important cognitive abilities necessary for academy and, ultimately, job success rather than on selected knowledges or skills that are expected to be learned in a police academy or acquired on the job. The abilities were identified by examining the literature of taxonomic research and police selection.

A master list of abilities was compiled by combining two taxonomies of cognitive ability areas from the available literature. These two taxonomies were developed by Fleishman, Theologus and Romashko (1970) and Ekstrom, French, Herman and Dermen (1973). The taxonomy list was expanded to 29 cognitive dimensions which included additional validated test areas (including the 5 IPMA test areas) in all (see Table C). The ratings of this list of 29 ability areas by SME's formed one part of the role-ability linkage evaluation step.

TABLE C

Master List of Abilities Developed in the Ability Identification Step of the Job Analysis, Including Areas Identified in the Taxonomies of Fleishman, Theologus and Romashko (1970), and Ekstrom, French, Herman and Dermen (1973) and the 1975 Police Services Validation Study (Wiesen et al, 1982)

<u>Ability Number</u>	<u>Ability*</u>	<u>Brief Definition of Ability</u>
1.	Listening	The ability to understand spoken words and phrases.
2.	Reading	The ability to understand written words and phrases.
3.	Speaking	The ability to use language to tell others about ideas orally.
4.	Writing	The ability to use language to tell others about ideas in writing.
5.	Number of Ideas	The ability to think of many ideas concerning a subject.
6.	Quality of Ideas	The ability to think of clever ideas on a given topic.
7.	Task Memory	The ability to remember new information which occurs as part of a task and which must be remembered in order to properly carry out the task. For example, in questioning a suspect one must recall the person's replies in order to develop a logical line of questioning. This ability does <u>not</u> include the type of memory involved in studying a text book.
8.	Span Memory	The ability to recall a series of items after one or more presentations of the series. For example, recall the license plate of a car which has passed from view.

<u>Ability Number</u>	<u>Ability</u>	<u>Brief Definition of Ability</u>
9.	Associative Memory (Rote Memory)	The ability to learn item groupings which have no logical relationship. For this type of memory two or more items are linked together without any logical basis for the linkage. For example, learning the proper pairing of a set of first and last names, or learning the names of various parts of a piece of equipment.
10.	Memory for Relationships	The ability to recall logical connections or relationships among previously learned items, such as operating procedures. For example, remembering the sequence of actions in CPR based on the logical relationship of the actions; first check for breathing, if person is breathing then the heart must be beating and no CPR is needed.
11.	Memory for Ideas	The ability to remember the main points of previously studied material. For example, recall the major points of a newspaper article, such as 'more money is needed to fund the retirement system of the state'. Rote recall is <u>not</u> part of this ability.
12.	Problem Sensitivity	The ability to recognize or identify problems. The reasoning ability needed to solve problems is not included here.
13.	Mathematical Reasoning	The ability to understand arithmetic word problems, and decide what must be done to solve the problem or what additional information is needed before the problem can be solved. (Arithmetic calculations are treated separately.)

<u>Ability Number</u>	<u>Ability</u>	<u>Brief Definition of Ability</u>
14.	Arithmetic	The ability to quickly and accurately manipulate numbers, for example: add, subtract, multiply and divide. (Deciding how to go about solving a mathematical problem is treated separately.)
15.	Deductive Reasoning	That type of problem solving in which general concepts are applied to specific cases, or stated facts are thought through to their logical conclusion.
16.	Inductive Reasoning	That type of problem solving in which hypotheses are formed and tried out to find how a given set of facts are related, or how individual cases are all examples of a general rule or concept.
17.	Information Ordering	The ability to reach an objective (or follow a rule) by arranging procedures in the best sequence. (May also involve ordering of: logical operations, mathematical operations, sentences, or other information.)
18.	Category Flexibility	That type of problem solving which involves thinking of and applying different ways of grouping a given set of information, or a set of information which is already well known.
19.	Spacial Orientation	The ability to maintain one's orientation in space or to establish orientation based on facts about location.
20.	Visualization	The ability to visually imagine what a set of objects would look like after specific changes, such as movement of some objects.

<u>Ability Number</u>	<u>Ability</u>	<u>Brief Definition of Ability</u>
21.	Speed of Recognition: Unknown Objects	The ability to swiftly combine and organize a set of apparently different elements into a meaningful pattern or figure. In this type of recognition the observer is not told what he/she is trying to identify. This ability applies to all senses, but the relevant and distracting stimulation must be within the same sense (e.g. vision).
22.	Speed of Recognition: Known Object	The ability to detect a previously specified object when that object is accompanied by distracting stimulation. This ability applies to all senses, but the relevant and distracting stimulation must be within the same sense (e.g. vision).
23.	Selective Attention	The ability to perform a task despite distractions or despite monotony. The task and the distraction may occur within the same sense or in different senses (e.g. trying to read in a noisy room).
24.	Time Sharing	The ability to use information obtained by shifting between two or more sources of information.
25.	Speed of Perception	The ability to quickly make comparisons in order to determine the identity or degree of similarity of objects. These comparisons may be made between pairs of objects presented simultaneously or closely in time. Alternatively, the comparisons may be made between a presented object and a remembered or standard object or set of objects. The set of objects to be compared must be in the same sense (e.g. auditory).

<u>Ability Number</u>	<u>Ability</u>	<u>Brief Definition of Ability</u>
26.	Spacial Scanning	The ability to select the best path to a goal based on rapid visual exploration of a wide or complex area.
27.	Human Relations	The ability to interact tactfully, fairly and courteously with people.
28.	Chart and Table Interpretation	The ability to read and use information presented in charts or tables.
29.	Interpretation of Hypothetical Rules and Regulations	The ability to read and interpret rules and regulations, such as those of a police department.

*The classical names of the ability areas reflect the long and glorious history of psychology, but are not descriptive for a lay person. For this reason many of the abilities were re-labeled with more descriptive items (e.g. speed of closure became speed of recognition: unknown objects).

Role-Ability Linkage Evaluation

An ability analysis procedure was developed which contained two complementary approaches for collecting and confirming job analytic information. In a quantitative approach, SME's rated ability according to its degree of importance for each of the seven job roles identified by ADL. In addition, a qualitative approach focused on conceptually linking abilities directly to job duties. Both approaches were pilot tested before use.

Before beginning the pilot administration of the ability rating procedure, SME's were told the purpose of this preliminary study. They were encouraged to offer their cooperation and to provide comments, criticisms and suggestions which they felt would aid in improving the proposed ability analysis procedures. They were also informed that all personal responses would be held in strictest confidence. SME's were presented with a reference list containing technical definitions of 23 distinct abilities. Each SME was asked to read through the list. Afterward, problem areas concerning the list's readability were identified and discussed. (See Table C for revised definitions of all 29 abilities in the final list). In a similar fashion, a process which solicited SME's reports on the perceived relationship between the ability areas and the job tasks was piloted. Three different types of procedures were piloted: task-ability

questionnaire, self-report, and panel interview. A brief description of each of these procedures is presented here. In the task-ability questionnaire approach, SME's were given a task by ability grid and asked to check those critical tasks which they felt required a given ability. Space for comments was also included next to each task. In the self-report approach, SME's were given ten minutes to brainstorm job tasks. In this instance, they were instructed to only write those tasks that an entry level police officer performs that would require a given ability. In the panel interview, staff members spent ten to fifteen minutes interviewing SME's to evaluate the relationship of abilities to tasks as in the self-report approach.

Several problems were observed during the conduction of the pilot study. Appropriate measures were taken to rectify the problems in order to develop the final set of procedures. The difficulties that SME's had in understanding the technical definitions of the ability areas were addressed. Virtually all the SME's had problems in reading and interpreting many of the ability areas and therefore several actions had to be taken. Although it initially seemed that using a complete list of full definitions would be beneficial to the SME's, it only compounded the problem. To address this, we substituted simpler definitions on the final rating form (see footnote to Table C). The

reading levels and length of the definitions were reduced and simplified. Instructions on the rating questionnaire were also simplified. Also, based on the recommendation of one of the SME's, a list containing examples of ability areas applicable to everyday life was developed as a training aid. This list, however, was used only by staff members as a training aid to facilitate the ability analysis process.

Another revision changed the assignment from an ability-task linkage to an ability-role linkage (see Appendix A for a copy of the final rating form). This served to reduce the SME's fatigue by reducing the number of ratings required. Thus, the number of SME's ratings was reduced from 1,633 to 203, that is, from 23 abilities X 71 tasks to 29 abilities X 7 roles. The final procedures incorporated a rating procedure, an interview procedure, and a self-report

In this way, the Division designed an ability rating form and procedure, piloted and refined it. The refined procedure was used to evaluate the 29 abilities and to link them to the 7 police roles described in the ADL study (Morton et al., 1979 - See Table B and Appendix A). About fifty SME's from police departments of various sizes participated in these steps of the job analysis. In the quantitative approach the SME's were asked to consider each role individually and to rate each ability in terms of its contribution to successful performance of the role.

Fifty-three male police officers (patrolmen) and police supervisors from 30 departments across the state served as SME's for the study. The police departments that were represented are shown in Table D.

TABLE D

Police Departments Represented in Job Analysis
(Role-Ability Linkage Step)

Large Departments
(150 + Officers)

1. Boston**
2. Cambridge
3. Braintree
4. Fitchburg*
5. Fall River
6. Woburn
7. Natick
8. Holyoke
9. Newton
10. Lowell
11. Taunton

Medium Departments
(20 - 49 Officers)

12. Andover
13. Chelmsford
14. Pembroke
15. Canton*
16. Saugus
17. Lynnfield
18. Bourne
19. Gardner
20. Shrewsbury

Small Departments (5 - 19 Officers)

21. Carver
22. Holliston
23. Ashland
24. Auburn*
25. Leicester
26. Orange*
27. Millbury
28. Avon

State Agencies

29. Capitol Police
30. Metropolitan District
Commission (MDC)

* These Departments were also surveyed in the ADL job analysis (Morton et al., 1979).

** SME's from the Boston Police Department met separately.

A breakdown of the ranks represented for each group appears in Table E.

TABLE E

Subject Matter Expert (SME) Job Analysis Participants:
Distribution of Police Personnel by
Rank and Department Size

Rank	Large	Medium	Small	Boston	State Service	Total
Captain	1	1	0	0	0	2
Lieutenant	1	0	0	4	0	5
Detective	0	0	0	1	0	1
Sergeant	5	3	1	5	2	16
Police Officer	9	4	7	7	2	29
Total	16	8	8	17	4	53

Fifty of the SME's were white, and 3 were minority officers. This low minority representation occurred despite our request to the Police Advisory Committee (including representation from the Massachusetts Afro American Police Association) which stressed the importance of minority representation. Overall, the mean age of the SME's was 39 years, with an average of 13.6 years on the force (see Table F for a breakdown by department size).

TABLE F

Means and Standard Deviations for Age and Number of
 Years on the Force by Department Size for
 Police Officers and Police Supervisors
 Participating in the Job Analysis
for the Entry Level Position

Department	Age	Years on Force
Large (sizes I & II) N = 16	$\bar{X}$ 41.75 SD 9.61	$\bar{X}$ 15.25 SD 8.65
Medium (size III) N = 8	$\bar{X}$ 36.12 SD 5.96	$\bar{X}$ 12.81 SD 6.06
Small (size IV) N = 8	$\bar{X}$ 38.25 SD 8.84	$\bar{X}$ 10.81 SD 8.37
Boston N = 17	$\bar{X}$ 40.92 SD 12.06	$\bar{X}$ 15.85 SD 10.39
Capitol Police N = 4	$\bar{X}$ 38.75 SD 4.57	$\bar{X}$ 6.75 SD 3.59
Total N = 53	$\bar{X}$ 39.02 SD 10.67	$\bar{X}$ 13.57 SD 8.87

The data collection phase of the ability analysis was conducted on six consecutive days. In general, each of the sessions lasted an entire day. A standardized explanation of the purpose and importance of the study was presented at each session. The explanation is summarized here.

At the start of each session, SME's were briefed as to the purpose and importance of the study. In each session, SME's took the meeting as an opportunity to offer criticisms, comments and complaints about previous police entrance examinations. Their suggestions for improving the selection procedures for police officers were welcomed.

SME's were asked to fill out biographical information sheets, and were assured that the information they provided would be confidential. Next, SME's were given a checklist of critical tasks performed by entry-level police officers (See Examination Announcement, Appendix B). These tasks, as identified by the ADL Study (Morton, et. al, 1979) were grouped according to the seven job roles. Participants were asked to read through the entire list, and to check for any errors or omissions in the task statements. Necessary additions, deletions, or modifications were made until all participants were satisfied that each role was properly defined. This list was almost universally acceptable without modification. Occasionally, department specific procedures required a change in a task within one of the roles. For example, for Boston only, the task of vehicle patrol was changed from patrolling in a one-man vehicle to patrolling in a two-man vehicle. This confirms the similarity between department seen in the ADL study and extended to three other major police departments (see Table B, above).

Finally, the ability analysis questionnaire was administered to each SME (see Appendix A for a copy of this questionnaire). Each of the 29 abilities were treated separately. The process by which abilities were considered entailed: (a) discussions of the abilities' definitions to ensure their clarity to all SME's, (b) self-report (brainstorming job behaviors which SME's felt required the specific ability), (c) panel interview, and (d) SME rating of ability areas.

Irrespective of the SME's current rank, all participants were instructed to consider the job of the entry level police officer, and were periodically reminded to consider only the abilities an applicant would need in order to be successful at the entry level. SME's were instructed to rate the importance of each ability in terms of its contribution to job success (i.e., performance) in each of the seven job roles. An 8 point scale was used to rate the importance of each of the 29 abilities. The scale was designed to encourage SME's to distribute their ratings over a wide range on the scale; 6 of the scale values indicated that an ability was of some importance to job performance. The scale is presented together with the mean importance ratings of ability areas by police role in Table G. The mean rating of importance for each ability in a given role was obtained by summing the numerical ratings for each comparison then dividing that total by the number of respondents making the rating.

TABLE G

Mean Rated* Importance of Ability Areas
by Police Roles

Abilities**	Police Job Roles***							Ability Mean
	1	2	3	4	5	6	7	
1	6.68	6.92	6.31	7.06	6.55	6.44	5.75	6.53
2	6.24	5.98	6.91	6.96	6.84	7.34	5.32	6.51
3	6.68	6.85	6.87	6.72	6.98	5.89	5.86	6.56
4	6.47	6.04	6.30	7.17	6.72	7.13	5.60	6.49
5	5.67	5.96	5.62	6.82	5.62	5.13	4.84	5.67
6	5.44	5.63	5.22	6.52	5.31	4.68	4.66	5.36
7	6.21	5.62	5.86	6.98	5.93	5.40	5.00	5.86
8	6.54	5.63	5.84	6.79	5.88	5.56	4.95	5.89
9	6.35	5.72	6.07	6.21	5.54	5.30	4.64	5.64
10	6.60	6.05	6.67	6.72	6.22	6.02	5.29	6.23
11	6.12	5.78	6.38	6.34	5.87	5.61	5.30	5.92
12	6.78	7.03	6.36	6.53	5.33	4.86	4.79	5.96
13	4.60	4.13	4.20	5.53	4.43	4.73	4.07	4.53
14	4.56	4.12	4.09	5.26	4.68	4.85	4.09	4.52
15	6.20	5.37	5.90	6.97	5.93	5.07	4.86	5.76
16	5.94	5.35	5.94	7.14	5.70	5.03	4.38	5.65
17	5.96	5.89	6.25	6.82	6.39	6.07	4.74	6.03
18	5.29	5.12	5.29	5.71	4.97	5.53	4.30	5.18
19	5.97	5.67	4.87	5.63	4.57	4.40	4.45	5.08
20	6.10	4.90	5.21	6.48	5.10	4.83	4.63	5.33
21	6.38	5.15	5.77	6.54	4.88	4.54	4.76	5.44
22	6.46	5.73	5.85	6.50	4.54	4.38	4.52	5.43
23	6.46	5.42	5.42	6.08	5.00	4.81	4.84	5.44
24	6.20	5.63	5.47	6.13	4.90	4.80	4.66	5.40
25	6.41	5.41	5.63	6.74	5.22	5.15	4.85	5.63
26	6.21	5.72	5.14	5.52	4.07	3.86	4.14	4.96
27	7.27	7.38	7.15	7.27	6.38	5.15	6.04	6.67
28	4.86	4.76	4.97	5.17	4.55	5.62	3.89	4.84
29	6.58	6.00	6.54	6.35	6.19	5.77	5.71	6.17
Role Mean	6.12	5.74	5.84	6.49	6.62	5.40	4.90	5.74

*Rating Scale: 1. Irrelevant 5. Important
 2. Not Important 6. Very Important
 3. Slightly Important 7. Great Importance
 4. Some Importance 8. Critical

**See Table C for list of abilities

***See Table A for list of Police Roles

The reliability for the mean ratings was calculated using an intra-class correlation approach (Guilford and Fruchter, 1973) and extended to a reliability estimate for a mean rating using the Spearman-Brown formula. The rater reliabilities for the mean ratings were .974 for ability ratings for a role (the bottom row of Table G), .932 for ability ratings averaged across roles (the righthand column of Table G), and .758 for the individual ability ratings for each role (the remainder of the ratings appearing in Table G, and in Table H.) These reliabilities are sufficiently high to indicate that the SME's were providing useable, high quality data, and to indicate overall agreement amongst the SME's, despite the possible differences in their perceptions which may result from their membership in departments of different sizes.

The mean importance for all police roles and abilities is 5.74, which is between the scale values of 5 (important) and 6 (very important) on the rating scale. When comparisons are made between police roles we see that, in general, the abilities were rated as more important for police roles 4 and 5 (investigating and assisting in protection) and less important for roles 6 and 7 (documenting and recording, and miscellaneous) with overall means of rated importance of 6.5 and 6.6 for roles 4 and 5, and means of 5.4 and 4.9 for roles 6 and 7, respectively.

The same data ranked ordered within each of the seven roles are presented in Table H. Here we see that human relations (ability 27) was rated most highly for 5 of the 7 police roles, and that reading (ability 2) and speaking (ability 3) were rated most highly for the roles documenting and recording, and speaking, respectively. The ability areas with a mean rating above a scale value of 7 (great importance) for one or more roles are: listening (1), reading (2), speaking (3), writing (4), inductive reasoning (16), problem sensitivity (12), and human relations (27).

When abilities are considered across roles (see the last column marked "ability mean" in Table G), the mean ratings range from a low of 4.8 to a high of 6.7. From Table H we can see that the range of the ratings is greater when the ability importance is considered for each role individually. Here the range of the means is from 3.9 to 7.4.

A Technical Advisory Committee consisting of professionals from the Division familiar with the entry level police officers job met to perform the same rating as the SME's. Their ratings corroborated the earlier ratings of the SME's. This agreement, together with the statistical reliability of the SME ratings, the accompanying qualitative data, which was logical and provided examples of the job behaviors which require each ability (see Appendix C), and our reviews of the literature, confirmed the quality of the judgements of the SME's,

TABLE H
Mean Rating of Importance of Abilities, Rank Ordered
Within Police Role

Role 1: Patrol	Role 2: Providing Services and Rendering Assistance		Role 3: Applying and Enforcing the Law		Role 4: Investigating		Role 5: Assisting in Protection		Role 6: Documenting and Recording		Role 7: Miscellaneous	
	Ability	Mean	Ability	Mean	Ability	Mean	Ability	Mean	Ability	Mean	Ability	Mean
14	4.56	4.12	14	4.09	28	5.17	26	4.07	26	3.86	28	3.89
13	4.60	4.13	13	4.20	14	5.26	13	4.43	22	4.38	13	4.07
28	4.86	4.76	19	4.87	26	5.52	22	4.54	19	4.40	14	4.09
18	5.29	4.90	28	4.97	13	5.53	28	4.55	21	4.54	26	4.14
6	5.44	5.12	26	5.14	19	5.63	19	4.57	6	4.68	18	4.30
5	5.67	5.15	20	5.21	18	5.71	14	4.68	13	4.73	16	4.38
16	5.94	5.35	6	5.22	23	6.08	21	4.88	24	4.80	19	4.45
17	5.96	5.37	18	5.29	24	6.13	24	4.90	23	4.81	22	4.52
19	5.97	5.40	23	5.42	9	6.21	18	4.97	20	4.83	20	4.63
20	6.10	5.42	24	5.47	11	6.34	23	5.00	14	4.85	9	4.64
11	6.12	5.62	5	5.62	29	6.35	20	5.10	12	4.86	24	4.66
24	6.20	5.63	25	5.63	20	6.48	25	5.22	16	5.03	6	4.66
15	6.20	5.63	21	5.77	22	6.50	6	5.31	15	5.07	17	4.74
26	6.21	5.63	8	5.84	6	6.53	12	5.33	5	5.13	21	4.76
7	6.21	5.67	22	5.85	12	6.52	9	5.54	25	5.15	12	4.79
2	6.24	5.72	7	5.86	21	6.54	5	5.62	27	5.15	5	4.84
9	6.35	5.72	15	5.90	3	6.72	16	5.70	9	5.30	23	4.84
21	6.38	5.73	16	5.94	10	6.72	11	5.87	7	5.40	25	4.85
25	6.41	5.78	9	6.07	25	6.74	8	5.88	18	5.53	15	4.86
22	6.46	5.89	17	6.25	8	6.79	7	5.93	8	5.56	8	4.95
23	6.46	5.96	14	6.30	17	6.82	15	5.93	11	5.61	7	5.00
4	6.47	5.98	1	6.31	5	6.82	29	6.19	28	5.62	10	5.29
8	6.54	6.00	12	6.36	2	6.96	10	6.22	29	5.77	11	5.30
29	6.58	6.04	11	6.38	15	6.97	27	6.38	3	5.89	2	5.32
10	6.60	6.05	29	6.54	7	6.98	17	6.39	10	6.02	4	5.60
1	6.68	6.85	10	6.67	1	7.06	1	6.55	17	6.07	29	5.71
3	6.68	6.92	3	6.87	16	7.15	4	6.72	1	6.44	1	5.75
12	6.78	7.03	2	6.91	4	7.17	2	6.84	4	7.13	3	5.86
27	7.27	7.38	27	7.15	27	7.26	3	6.98	2	7.34	27	6.04

Ability Evaluation

Two statistical analyses were performed in 1979 to determine if SME's consistently rated certain ability areas as more important to job success than the rest. The first analysis was an omnibus F test, which is an analysis of variance with repeated measures (Keppel, 1973, pp. 86-87), the second analysis was a Newman-Keuls pair-wise comparison of means (Keppel, 1973, pp. 136-137.)

Based, in part, on the results of these analyses, ability areas were identified which SME's consistently rated as relatively more important. Ability areas(s) so identified would be considered for inclusion on an experimental basis in future examinations.

The analysis of variance (computed for 50 raters) indicated significant effects for roles, abilities and the role by ability interaction ($F=17.86$, with 6 and 294 df, p less than .001; $F=12.9$, with 28 and 1372 df, p less than .001; and $F=4.12$ with 168 8232 df, p less than .001). Thus, there were statistically significant (reliable) differences in the importance ratings. An additional post-hoc pair-wise analysis was conducted to more exactly identify the locus of the significant differences. To control the statistical error which is possible when many comparisons between pairs of means are made in a repeated measures design such as this, a Newman-Keuls test was employed. Significance values were computed separately for the possible comparisons within each of the seven police roles.

Potential new test areas whose significance values exceeded the appropriate critical value, were identified if the mean importance rating for an ability was at least 7.0, or if a break could be seen in the pattern of mean ratings within each of the roles. The following new abilities (i.e., abilities not included in the 1975 IPMA exam) were identified using this procedure: listening, speaking, problem sensitivity, human relations, memory for relationships, and task memory. It should also be noted that several of the IPMA areas, namely reading (comprehension) and inductive and deductive reasoning were also corroborated by this analysis. Of these new ability areas we decided that we would try to measure two: human relations (which did not seem very amenable to testing with a written instrument, but which was included due to its high importance rating), and task memory (which seemed most amenable to measurement with a written instrument).

Discussion

Based on the results of the analyses performed on the data gathered in all phases of the job analysis the Division concluded the following. First, the job dimensions of the entry level police officer position, as evidenced from both the findings of the ADL study (Morton et al. 1979) and the Division's extension of that study, appear to be essentially the same across the state. Understandably, variations in job activities do arise. This, however, should be expected since every police department within a municipality must

respond to its own community's special needs. Despite these differences, the job primarily consists of universal aspects, which may be summarized in seven police roles (See Table B). Further, across the state there is great agreement in the abilities considered by SME's as important to perform these police roles.

Second, the analysis indicated that several ability areas not included in the 1975 examination (the IPMA exam) might also be predictive of job success.

Third, several of the IPMA examination areas were rated more important to job success than the rest of the abilities. All of the IPMA areas were rated as having some importance to job success.

The in-house job analysis in combination with the criterion-related validity study supported the Division's decision to construct the 1981 examination to test the same areas as the 1975 IPMA and the 1979 examinations, and to include two additional ability areas on an experimental basis; human relations and memory. Furthermore, the job analysis results were incorporated in the examination announcement for entry level police officer (See Appendix B).

CONSTRUCTION OF THE 1981 EXAMINATION

The 1981 examination was constructed with the following objectives:

1. The weighting of the subtest areas should incorporate findings of the criterion-related study.
2. The appropriate reading level should be chosen.

3. Job analysis information along with other related materials (e.g., police academy training material, various municipal rules and regulations pertaining to police departments, etc.) should be incorporated into the development of test items to insure that the examination is both content and face valid.

4. A content-construct comparable form of the IPMA J:A-1(M) should be constructed and pretested prior to the 1981 test Administration.

5. Experimental test items should be developed, pretested, and included in the examination. These items should be culturally unbiased in content, positively correlated with the IPMA and designed to measure the cognitive ability areas which, based on the criterion study (Wiesen et al., 1982)* and the findings of the 1979 job analysis study, indicate importance to job success.

6. Test items should be screened to minimize measured adverse impact (therefore, the pretest sample should include minority representation). The 4/5 rule of thumb should be applied to the selection of "live" items.

7. An orientation booklet should be available in both English and Spanish in order to assist applicants in preparing for the examination.

8. A good Spanish translation of the examination should be available. This should be a "universal" translation as opposed to a translation which may favor one Hispanic group over another.

9. An English literacy test for Spanish-Surnamed applicants should be selected which has the appropriate reading level and which is more down to earth (has fewer allusionary items) than the Davis Reading Test used previously.

*See footnote on page 5

Weighting of Subject Areas

The number of test items on the 1975 IPMA exam varied considerably by type of item. The relative weight given to each area tested may be described by the proportion of items of a given type (the number of such items divided by the total number of items on the exam). These weights* were:

1. Verbal Reasoning, .35
2. Number Series, .07
3. The Interpretation, .08
4. Interpretation of Hypothetical Rules and Regulations (or Departmental Orders), .21
5. Reading Comprehension, including Interpretation of Orders, .28

However, the criterion-related validity study indicated that the variance between the predictive ability of the subtests was not great. Wiesen et. al (1982) reported the validity coefficient for the IPMA test areas to be:

1. Verbal Reasoning, .23
2. Number Series, .21
3. Table Interpretation, .17
4. Interpretation of Hypothetical Rules and Regulations, .18
5. Reading Comprehension .22

* The weights do not sum to precisely 1.00 due to rounding error.

The Division decided to weight the subtest areas using the results of the criterion-related study, the original weights of the IPMA, along with professional judgement. Contrary to intuition, the literature indicates that the precise weights given an area do not greatly affect the overall test total score (e.g., Dawes, 1979, but see Remus, 1980). Thus there is some room for judgemental decision based on quasi-psychometric grounds, such as face validity or historical precedent (we sought to avoid a sudden drastic change from the 1975 and 1979 examination composition.) The weights selected are as follows.

1. Verbal reasoning was given a weight of .29, which is equidistant between the original IPMA and the Massachusetts criterion-related validity weights.
2. Number series weight was increased from .07 to a weight of .12. It was decided that even though the Massachusetts validity data would allow a larger weighting, the inherent low "face" validity of the number series only allowed a .05 increase of weighting. (The importance of this area was rated somewhat lower than the other ability areas, see Table H).
3. Table interpretation was given a weight of .11 which is approximately equidistance between the original and criterion-related weights. (Again this area was not given its full weight as indicated by the validity study due to its lower importance rating, see Table H).

4. Interpretation of hypothetical rules and regulations was given a weight of .24. This is somewhat higher than the IPMA or validation study weights, primarily because it was absorbing some of the weight from the number series and the reading comprehension areas.
5. Reading comprehension was given a weighting of .24 which made it more in alignment with the criterion-related weight. Its weight was also reduced from the original weight because the Castro plaintiffs were concerned about reading comprehension being 28% of the examination.

The final subtest weights for the 1981 examination were thus:

1. Verbal Reasoning, .29
2. Number Series .12
3. Table Interpretation, .11
4. Interpretation of Hypothetical Rules and Regulations, .24.
5. Reading Comprehension, .24

Reading Level

Several steps were followed to determine the reading level at which the examination was to be constructed. First, a review of the literature on reading level in police selection was done. Second, an analysis of the reading material used by the Boston Police Academy was made. For example, the IPMA test was based on a job analysis performed in California and Nevada in 1973. That job analysis showed that the verbal material which police officers typically encounter is at the 11th to 12th grade levels (Wollack, Clancy and Beals, 1973).

A similar examination of reading materials was conducted in Massachusetts utilizing the Fog Index to determine reading level. The formula used in computing the Fog Index may be found in Appendix D. The material analyzed from the Boston Police Academy and samples of their reading level are listed in Appendix E, Table 1. These materials had an average reading level of 15.537.

The Division decided to test English speaking applicants at the 10th grade reading level which is below that required to read the material typically used in the police academy for the following reasons.

1. Some research has shown that "reducing a test's reading level increases its validity" (Davey, 1975).
2. The project staff of the California and Nevada Study stated that they did not equate the reading level of the test with the reading level of the verbal material used by the police officers. They also suggest that such an equation would result in a test which confounds the measurement of the particular subject areas and reading and that a distinction should be made in order to produce a fair predictor of job success.

The reading level for the 1981 examination was calculated on several passages of the examination that required substantial reading (see Appendix E, Table 2). The average reading level for those passages was 10.13. A reading level calculated on 53 items used in the final examination had an average reading level of 9.76 (see Appendix E, Table 3).

Precautions Taken in Development Phase to
Safeguard Against Cultural Bias

First, a cross-section of people (by ethnic background, race, and sex), placed in various situations, was represented in the items developed. Second, members of a minority group were not presented in stereotypic roles. For example, a member of a minority group was not always presented as the "key suspect" in a crime item. A crime situation instead might include a "group of White, Black, Hispanic... suspects involved in a crime." Third, racial and ethnic groups were also socially stratified in a multitude of situations. Finally, a report written for the Commonwealth of Massachusetts, the Guidelines for the Identification and Elimination of Test Bias in Standardized Tests (Flaughner, Nieves, Slaughter, Wiesen and Woodford, 1979), was used as an aid in designing test items; particularly the Guidelines' section "Modes of Offensiveness in Test Items," in which three modes are described as follows.

- I. Primary Offensiveness: "Involves the use of an item which directly uses and consequently reinforces a negative and stereotypic image of a minority group."
- II. Secondary Offensiveness: "Involves questions which appear to require certain factual information, but which indicate a lack of the sense of the history of the minority group involved."
- III. Tertiary Offensiveness: "Involves the use of highly controversial material on minority groups."

The Division's aim in designing items was to avoid any of the primary, secondary or tertiary forms of offensiveness.

Pretest

The Division decided to pretest the 1981 Police Officer Examination for two main reasons. They were:

1. To create a pool of high quality test items having low adverse impact from which selection could be made for the final examination.
2. To correlate the 1981 examination with the 1975 IPMA examination.

Composition of Pretest Examination

Two hundred and fifty-two new test items were developed for the pretest. Of the 252 items, 190 were similar to the 5 subtests of the 1975 IPMA and 62 were similar to the two experimental subtests of the 1979 examination. The original 71 IPMA items were also given as part of the pretest for a total of 323 items. For all the test areas relevant job information and related material were incorporated into item development whenever possible. For example, the "rules and regulations" area included items which pertained to the critical tasks found in each of the seven police officer job roles identified by the ADL job analysis study (Morton et al., 1979). Furthermore, actual rules and regulations of various municipalities across the state were modified and included in this test area.

The 323 items were incorporated into 3 test booklets. All pretest examinees answered all three booklets. The major reason for this was to equally weight each booklet and to avoid boring the applicants by giving them too many of the same type of questions to answer at any one time. Form 1 included the experimental memory section and the 1975 IPMA and was administered first to all applicants. Forms A and B were organized in the same manner as the IPMA and had approximately the same number of items in each form (A and B). In order to control for fatigue, the subjects were divided into 2 groups. The two groups were given booklet A and B in balanced design, some receiving booklet A first, some Booklet B first. The pretest outline and ability areas are presented in Table I.

Pretest Administration

The pretest was administered in a major city outside the Commonwealth by a team of psychologists who, pursuant to the Division's requests, recruited and selected subjects and administration staff, provided an administration site and lunch, and administered the test materials. Lunch was provided since the pretest required both a morning and an afternoon to complete.

TABLE I

Test Outline for the Pretest

	<u>Ability Area</u>	<u># of Items</u>	<u>Item Numbers</u>
Form 1.	Memory (Experimental 15 Minutes)	32	1 - 32
	Verbal Reasoning and Number Series	30	33 - 62
	Table Interpretation	6	63 - 68
	Departmental Orders	15	69 - 83
	Interpretation of Orders	5	84 - 88
	Reading Comprehension	15	89 - 103
	Total Items	103	
Form A.	Verbal Reasoning	28	1 - 28
	Number Series	11	29 - 39
	Table Interpretation	12	40 - 51
	Departmental Orders	24	52 - 75
	Interpretation of Orders	12	76 - 87
	Reading Comprehension	17	88 - 104
	Human Relations (Experimental)	15	105 - 119
	Total Items	119	
Form B.	Verbal Reasoning	28	1 - 28
	Number Series	11	29 - 39
	Table Interpretation	8	40 - 47
	Departmental Orders	22	48 - 69
	Reading Comprehension	17	70 - 86
	Human Relations (Experimental)	15	87 - 101
	Total Items	101	

Composition of Pretest Examinees Requested by the Division

Twenty-five black or hispanic males, 25 black or hispanic females, 25 white males and 25 white females, all between 19 and 32 years of age were requested by the Department. All examinees had at least a high school diploma or its equivalent.

Recruitment of Pretest Examinees

Examinees were recruited to participate in what was called a "paid pilot study in the area of commercial testing." The study was conducted under a pseudonym to maintain the confidentiality and security of test materials.

Several agencies were selected as sources for recruiting the necessary population. The type of agencies identified as possible sources for examinee recruitment included: sheltered workshops, employment agencies, colleges and universities. The criteria for selection in the study were: employable males or females, black or white, between the ages of 19 to 32. These criteria were chosen based on the entrance requirements for the exam (age limits, education) and our research needs (race, ethnicity, and sex).

A total of 144 persons returned application forms for the pretest. From this group of applicants, 100 persons who met the above criteria were contacted and confirmed as participants in the study. Also, 10 individuals were contacted to serve as "alternates" in the event of "no shows".

Since the number of "no shows" was greater than expected, the final number of pretest examinees was 84. The majority of the "no shows" were unemployed high school graduates. About 50% of the examinees were white and 50% were male. The demographics of the pretest examinees are further summarized in Table J.

Testing

Testing went smoothly. There appeared to be a clear understanding of instructions and procedures. Exam forms and answer sheets were checked by the proctors for continuity and completeness. Examinees responded well to the break for lunch and required relatively little supervision on the task. The level of motivation appeared to be high, evidenced by the amount of time the examinees took in order to complete the test. The examinees were told that the individuals receiving the top two scores would receive a cash bonus and that all ties on the top two scores would be honored.

Table J

Demographics for Pretest Examinees

N = 84Sex

Male	44
Female	40

Race-Ethnicity

Caucasian (White)	37
Black	46
Hispanic	1

Education

Eleventh Grade or Less	0
High School Graduate or Equivalency Diploma	4
Some College	51
College Graduate	10
Post-Graduate	19

Age

18 and under	5
19 - 21	41
22 - 25	18
26 - 30	16
31 - 32	4
33 and over	0

Veteran Status

Yes	3
No	80
No response	1

All examinees were paid for their participation immediately following their completion of the examination. All examinees were thanked for their participation and reminded that they would be contacted if they won the incentive bonus. Examinees were also asked to complete a data information sheet prior to test administration and a test evaluation questionnaire after test administration (See Appendices F and G). Most subjects, when asked about the test experience, responded favorably.

Two Division personnel participated in the pretest administration and were introduced to the subjects as "testing technicians". The Division's personnel maintained control of the material, supervised security and inspected the completeness and total number of all examination booklets both before and after the pretest. Only the psychologists conducting the study knew the employees and the state of origin of the project. The information given to proctors and examinees alike was that the questions were being evaluated for possible inclusion in a police examination.

Analysis of Pretest Results

An item analysis was performed on each of the 252 new items in the pretest (See Appendix H, Tables 1-14). This analysis provided the percent correct responses for the minority and non-minority examinees, as well as frequency of choice of the distractors, and other statistics. This data bank provided the basis for the selection of the final test items.

The criteria used for determining inclusion of pretest items into the "live" examination were (in order of priority):

1. At least 70% of the examinees answered the item correctly, and the black/white ratio was 80% or better.
2. The item had one of the highest black/white ratios (still over 80%) and at least 55% of the examinees answered the item correctly.

Use of the first criterion should yield an average score on the examination above 70%; however, it should also minimize adverse impact since the 4/5 rule was being used for the selection of items. The second criterion was also chosen to minimize adverse impact, without greatly increasing the difficulty level of the examination.

Four exceptions to the criteria previously described were made in order to include particular items type which would not be sufficiently sampled in the "live" test otherwise. In all four items, minor revisions were made to eliminate faulty distractors and thus improve the quality of the item. In addition, all four items met the 4/5 rule.

Five items which met the original criteria were also edited (because of their close proximity to the cut off) before inclusion in the "live" test.

Finally, 125 items (including 33 experimental items) were selected for the "live" examination. The item statistics for the selected items are presented in Table 1 of Appendix I. The final examination outline is presented in Table K.

TABLE KTest Outline for the 1981 Police Services Examination

<u>Ability Area</u>	<u># of Items</u>	<u>Item Numbers</u>
Memory (Experimental Area)	15	1 - 15
Verbal Reasoning	28	16 - 43
Number Series	11	44 - 54
Table Interpretation	10	55 - 64
Interpretation of Hypothetical Rules and Regulations (Departmental Rules and Regulations)	23	65 - 87
Reading Comprehension	23	88 - 110
Human Relations (Experimental Area)	15	111 - 125

Correlation of Items Selected with the IPMA

The 95 items chosen for the "live" Police Service exam were correlated with the items on the IPMA, (i.e., the 1981 exam was correlated with Form 1 of the pretest, excluding the memory section). The correlation between the IPMA and the 1981 examination is .71. This raw score correlation is a reflection of a somewhat higher true score correlation between the tests, which may be estimated by correcting for the slight unreliability of the IPMA. The true score correlation of the IMPA of the 1981 exam may be estimated to be .73. $(.71/\sqrt{(.95)} = .73)$.

Correction for restriction in range was not undertaken. Suffice it to say that the true correlation between the IPMA and the 1975 exam is higher than .73.

The comparison between the IPMA and the 1981 items also indicated that the 1981 examination would be easier than the IPMA, as is demonstrated by the following:

1. IPMA's mean is 68.79, with a standard deviation of 12.36 (1981 pretest).
2. The 1981 examination's mean is 78.56, with a standard deviation of 14.16, based on the pretest.

However, the Division decided to risk the possibility of an easier examination in an effort to reduce adverse impact. Also, it was believed that since personnel selection is primarily from the top down on a ranked civil service roster. Since the police Appointing Authorities do not have to select from the lower end of the list, the lower difficulty level of the examination should not effect the quality of the applicants selected. Of course, the passing scores for the 1981 exam would probably be higher as a result of the ease of the exam. The difficulty level of the test items was chosen so that the passing point could be placed at the historical 70% and yet be -1 SD below the mean of incumbent police officers. This will be discussed further below.

Orientation Booklet

In order to assist applicants in preparing for the examination, the orientation booklet from the 1979 examination was revised, translated into Spanish, published and then distributed throughout the Commonwealth in both English and Spanish for the 1981 examination.

Translation of Examination

Since the Castro vs. Beecher consent decree stipulated that the examination be offered in Spanish, the 1981 examination was administered in Spanish as well as English.

In order to provide Spanish speaking applicants with a correct translation which would transcend dialectical differences, the Division hired two consultants, one a native of the Caribbean and one a native of South America to translate the examination. The consultants also worked with the Division personnel to insure that the content, integrity and spirit of the English version was maintained in the Spanish.

The native language for both translators is Spanish. Both translators are actively bilingual in English and Spanish and educated in both languages. A translation was not approved, unless both translators were satisfied with the terms or phraseology. Also, the nuances of the original English and of the Spanish translation were discussed with the Division personnel in order to ensure the maintenance of the meaning of the individual items. (Similar care was taken in the preparation of the orientation booklet.)

Finally, after the examination was given a third translator (whose first language is Spanish and who is actively bilingual in Spanish and English) was employed to look at all items for which less than 50% of the applicants chose the correct answer on the Spanish translation. Of the items examined: (1) Four items were miskeyed; (2) Two items were transposed in typing, but were valid as typed; (3) One item had the same distractor given twice, but had a definite correct answer; (4) Two items had flaws in the distractors (i.e., the distractors differed slightly from the English), but the correct answer was clear; and (5) All other items were clear.

English Literacy Test for Spanish-Surnamed Applicants

As a result of the Castro vs. Beecher consent decree, Spanish surnamed applicants were given the option of taking the examinations for the position of police officer in Spanish. The same consent decree stated that the Personnel Administrator "shall require such persons who take said examination in Spanish to pass a literacy test to demonstrate their ability to read and write the English language". To ensure equal treatment, the English competency test for Spanish-surnamed applicants was selected at a reading level below the reading level of the material used at the academy. As mentioned earlier the academy material was at 15.537, while the 1981 examination was at 9.76.

The Davis Reading Test previously employed by the Commonwealth as the instrument for determining English competency was not used in the 1981 examination, since it has less face validity than other reading tests which are available. The Division's personnel researched the published test literature to find an instrument which had more face validity and which also met the requirements of the EEOC and professional guidelines, in such areas as, validity, reliability, normative data and reporting method.

Several tests were reviewed and eliminated for varying factors. For instance, the Stanford Achievement Test: High School Reading was eliminated because it is geared to high school students and consists primarily of historical passages. Historical passages are prevalent in many standardized reading and achievement tests; however, they have limited relevance to the police service. Tests designed for use with non-native English speakers were also examined, and eliminated. Two problems were encountered with these tests. First, many were designed to test college-bound students (e.g., the Michigan Test of English Language Proficiency and Test of English as a Foreign Language-(TOEFL)). The second problem encountered was that many of these tests are not available to the general public but restricted to specific federal agency use (e.g., the English Usage Test for Non-Native Speakers of English and a Vocabulary and Reading Test for Students of English as a Second Language). In addition, other tests were reviewed and eliminated on the basis of poor normative data, low reliability, low validity or insufficient technical data.

After considerable research, the Comprehensive Tests of Basic Skills: Reading level 3 (CTBS) was chosen. It has more face validity than the Davis. The content in the reading comprehension selections is closer to everyday life. Also, the developers of the CTBS have written passages that are clearly designed to attract the interest of adults rather than high school students. There are several other factors which make the CTBS a good choice. It has representative and normative data for minorities. It also provides separate norms for public and parochial schools. It also provides norms for large municipalities. The grade range for level 3 of the CTBS test is from 6.5 to 8.9. The scores can be reported as grade equivalents or other

indices, e.g., percentile ranks, stanines and standard scores. CTBS is also a technically sound device. The Kuder-Richardson (KR-20) reliabilities at each grade level for vocabulary, comprehension and total scores are almost all above .90. Interform reliability coefficients tend to be in the high .80's for the total reading score. Earl F. Rankin stated "the CTBS reading test is probably a highly valid test..." (in Buros, 1972, p. 1074).

The Division decided to establish a cut score of 31 items correct out of 45 items for determining the English competency of Spanish-surnamed applicants because it is the equivalent of an 8th grade reading level. An 8th grade cut score is below the reading level of the material used by the police academy and approximately one year below the reading level of the English version of the examination. The basic reasons the level 3 CTBS was chosen with a cut score of 31 is as follows: (a) test items on higher level tests often involve literary allusions of a type that will probably never be seen by police officers on the job; (b) the 8th grade level is approximately the highest level for which a reading test with good "face" validity could be found; (c) since the IPMA test itself is written at the 10th grade level, and since the Castro vs. Beecher court decree requires that the exam be administered with a Spanish translation available, it does not appear to be in the spirit of the court decree to require a reading test above the level of the regular (English) police exam; and finally, (d) the Division believes that this level of reading ability will be sufficient to allow applicants who are highly motivated to comprehend the reading material encountered at the academy and on the job.

Incumbent Testing

A total of 50 police officers participated in the incumbent testing. Forty-nine of the officers took the examination at the designated incumbent site. One officer had personal difficulties finding a baby-sitter and took the test at a "regular" examination site. While the test data is available for the 50th officer, he did not fill out a test evaluation questionnaire.

Recruitment

Chiefs from a total of 27 municipalities along with MDC, MBTA, and the Capitol Police were contacted to help the Department recruit a representative sample of incumbents to take the incumbent testing in order to help assist the Department in the determination of a passing point, the difficulty of test items and the possibility of irrelevant items. The Massachusetts Association of Afro-American Patrolmen (MAAP) was also contacted to aid the Department in obtaining a representative sample.

Incumbents were told they had to be between 19 and 32 years of age. They were also told they would be paid \$40.00 for approximately four hours of their time and that individuals receiving (or tying) the top two highest scores would receive an additional bonus of \$40.

The efforts to recruit incumbent police officers were hampered by the postponement of the examination. (The examination was originally scheduled for April 25, 1981. It then had a tentative date of June 28, 1981. The examination was finally given on November 14, 1981.)

The examination was not given as originally scheduled because the Castro plaintiffs requested a postponement. However, the postponements encouraged loss of interest by the potential participants. Although a total of 100 officers were recruited, only 50 took the examination. Thus, only half of the candidates recruited attended the examination. A large proportion of "no shows" were minority incumbents.

Of the 50 incumbents who took the examination, 45 identified themselves by ethnicity: 36 were white, seven were black, one was Hispanic and one was American Indian; 45 also identified themselves by sex: 35 were male and 10 were female. Individuals who did not identify themselves by ethnicity or sex were counted as white males.

Test Evaluation by Incumbents

Of the 49 incumbents who filled out the test evaluation questionnaire, 92% rated the overall examination as good or excellent and 8% rated it mediocre or below.

Incumbents' Scores

The incumbents did very well on the examination, as can be seen from the following data:

1. Minorities had a mean of 84.9 with a standard deviation of 7.4.
2. Non-Minorities had a mean of 90 with a standard deviation of 4.8.
3. Overall, incumbents had a mean of 89.2 with a standard deviation of 5.6.

Post-Test Review

The examination results were subjected to a careful post examination review. The pattern of incumbents' and applicants' answers to the choices for each question were evaluated through use of an item analysis. The Spanish version of the exam was similarly evaluated, as described briefly previously.

Item Analysis

Any item for which fewer than 50% of the applicants chose the key response was reviewed to determine the relevancy of the item to the job, the difficulty of the question, and the accuracy of the key response as correct and the distractors as incorrect.

We discovered a typographical error in item 48 which resulted in there being no correct answer presented. Therefore, we gave credit to all, any and no response for item 48. (Credit was given for item 48 on the Spanish version, as well, even though the typographical error did not appear on the Spanish version.)

In addition we double-keyed item 66 because the suspect to be searched in item 66 was not specifically identified as a "female." However, the context of the item, given that the rule and regulation was labelled "WOMEN" would provide a mental set for the majority of the applicants to believe "the rules allow the action." At the same time the applicants who did not perceive the sex of the suspect as implicit would choose "a more detailed explanation is required to determine whether the action is allowed or is a violation." Therefore, we chose to double-key item 66. (Item 66 was also double-keyed for the Spanish translation. See Translation of Examination for further details.)

Letters of Complaint

Only one item received a formal complaint, item number 90. An applicant contended that there was no correct answer to item 90. However, the following analysis shows that the applicant's contention was unfounded.

Item 90 states "Of the following, the statement which is true is:" and then gives four choices. The correct choice is "A. Officer Davis will report to Sergeant Waters during the week of July 26-August 1." Choice A is correct because TABLE I on the test tells us that "Officers Davis, Barnes, and Tracy are assigned to Sergeant Waters. Since Table I is the NON-VACATION ASSIGNMENT TABLE, Officer Davis will be reporting to Sergeant Waters, except when Sergeant Waters is on vacation and when he, Officer Davis, is assigned to the Detective Bureau the week of July 19-July 25.

Since Sergeant Waters is actually on vacation, according to Table G on the test, the week of July 19 - July 25, Officer Davis would report to Sergeant Waters every week during July with the exception of Sergeant Waters's vacation week.

Considerations Bearing on Suggested Passing Point

Difficulty of Examination

Generally, the passing point for examinations are set in order to pass two times the number of perspective vacancies plus one ($2n+1$) and to meet the Federal Guidelines' 4/5 rule; however, both of the previously mentioned criteria are relaxed if:

- a) 90% or more of the majority (non-minority) has to pass in order to meet the 4/5 rule; and
- b) 80% or more of the total applicant population has to pass in order to meet the ($2n+1$) rule.

In addition, the Division does not set a passing score above 70 on a civil service examination, for public relations reasons.

In order to maintain the integrity of the examination, the passing point must be set at a point in which at least those individuals who performed least well on the examination are not allowed to pass. Since the criterion-related study conducted by the Division demonstrated the validity and utility of the examination (see Figure 1), ranking on the basis of the scores is appropriate. Eighty percent of the total population passed at a cut score of 81; ninety percent of the non-minority passed at a cut score of 76.

In addition, as demonstrated by the means and standard deviations of the pretest, the 1981 examination is an easier examination than the 1975 IPMA examination. The IPMA had a mean of 68.79 with a standard deviation of 12.36, while the 1981 examination had a mean of 78.56 with a standard deviation of 14.16. Therefore, the 1981 examination, as demonstrated by the pretest, is almost 10 points easier than the 1975 IPMA. The passing point employed for the 1975 IPMA was 61.

Also, if we examine the percentage of individuals who passed at a given cut score for the last three police examinations, we realize that the 1981 examination is easier than the last three examinations and the 1981 exam could justifiably have a cut score ranging from 75 to 84. For example:

1. Overall percentage passing for the:
 - a. 1975 examination is 72.9, which is equivalent to a passing point of 84% for the 1981 examination.
 - b. 1978 examination is 85.4, which is equivalent to a passing point of 78% for the 1981 examination.
 - c. 1979 examination is 80.8 which is equivalent to a passing point of 81% for the 1981 examination.
2. Non-minority percentage passing for the:
 - a. 1975 examination is 76.6 which is equivalent to a passing point of 83% on the 1981 examination.
 - b. 1978 examination is 87.8 which is equivalent to a passing point of 78% on the 1981 examination.
 - c. 1979 examination is 91.8 which is equivalent to a passing point of 75% on the 1981 examination.

3. Minority percentage passing for the:
 - a. 1975 examination is 36.5 which is equivalent to a passing point of 82 on the 1981 examination.
 - b. 1978 examination is 50.9 which is equivalent to a passing point of 78 on the 1981 examination.
 - c. 1979 examination is 51.6 which is equivalent to a passing point of 78 on the 1981 examination.

Job-Related Passing Score Selection Using
Incumbent Testing as a Criterion

On this valid examination, the higher the passing point, the better the passing group is logically and reasonably expected to perform on the job. This would lead one to choose the highest passing score possible which allows a sufficient number of candidates to pass the examination to fill the openings (perhaps allowing 5% to pass, for a passing point of 95). This would run counter to the spirit of the law as it regards veterans' preference and the special certification provisions for minority applicants pursuant to the decision in the *Castro v Beecher* court case. For this reason especially we considered the level of test performance of incumbent police officers. In this way we would be assured of setting a passing point consistent with the normal expectations of proficiency within the workforce as called for by Section 15.C (7) of the Uniform Guidelines (1978). The source of the incumbent sample has been discussed previously.

It is reasonable to say that in order for the Division to reliably state that the applicants selected will make good police officers the cut score should be set at a point no lower than that of the majority of current employees, for example, no more than one standard deviation (SD) below the mean ($\bar{x}$) of incumbents' test scores.

A passing score set at 1 SD below the mean would allow 85% of the current incumbents to pass. One could argue for a lower passing score based on the idea that every score of a current employee should be a passing score. Conversely one could argue for a higher passing score on the grounds that the current incumbents are not as motivated in their test taking efforts as they were when they were applicants. Let us turn from such discussions to the incumbent data. The test performance of the incumbents may be summarized as follows:

a. Minority incumbent	$\bar{X} = 84.9\%$	SD = 7.4
b. Non-Minority incumbents	$\bar{X} = 90.0\%$	SD = 4.8
c. All incumbents	$\bar{X} = 89.2\%$	SD = 5.6

Since the incumbent's mean score is 89.2% and the SD is 5.6, a passing point of 83% would allow the Division to predict that the applicants selected would be at least adequate officers.

Satisfying Castro Court Order for Ratio Certification

The six largest municipalities have a list with a sufficient number of minority names. This list will last for one more year. Therefore, the analysis given is based on the remaining municipalities in the state.

The chart below gives the number of minority applicants needed to pass the exam for various projected openings. The chart assumes that 50% of minorities will fail the medical and 50% will not accept an appointment as a police officer.

<u>Projected Number of Openings</u>	<u>Number of minorities who need to pass exam</u>
4	4
40	40
100	100

As can be seen, the number of minorities equals the number of openings, under these assumptions. For the first year, if we are likely to make about 100 appointments from the list, a passing point of 82 would satisfy the Castro Court Order in this respect. (In FY81 we made about 730 police appointments, including 170 for Boston's last certifications.) (There are currently about 12 openings which are not likely to be filled from reserve lists.)

Of course, as soon as the 6 major cities begin drawing on the list, the minority pool will be exhausted quickly and a new exam will be needed (this will take an estimated 1.5 professional years and \$15,000 for consultants).

Ratio of Minority to Non-Minority Passing Rates

In order to meet the EEOC's 4/5 rule of thumb; the cut score would be 61% and 97% of the applicants would pass the written test. A cut score which passes 97% of the applicants, severely limits the usefulness of an examination; it compromises the purpose of the examination.

However, the minority/non-minority ratio was 1.0 for the incumbents with a cut score of 70. Also a cut score of 70 would yield a minority-non minority ratio of .69 on the actual examination. A ratio of .69 is the highest ratio for all the police services examinations given since 1975 (see Table L).

The standard deviation (SD) for the minority applicants on the 1981 examination is 15.54 while the SD for the non-minority population is 8.99. From this we see that the population of minority applicants

TABLE L

Percent of Applicants Passing and Ratio of
Minority to Non-Minority Passing Rates For Recent.
Police Services Examinations

<u>Examination</u>		<u>Passing Score</u>	<u>%Passing Minority Col. A</u>	<u>%Passing Non-Minority Col. B</u>	<u>%Passing Overall</u>	<u>Ratio of Col. A to Col. B</u>
Police Incumbents '81	70% (Suggested)		100	100	100	1.0
Police Services '81	70% (Suggested)		65.8	94.9	93.2	.69
Police Services '79	68%		51.6	91.8	80.8	.56
Police Services '78	61%		50.9	87.8	85.4	.58
Police Services '75	61%		36.5	76.6	72.9	.48

was more varied in ability than the population of non-minority applicants. This may be due to our extensive recruiting efforts. Therefore, in the future, we might consider gathering more demographic material on the minority candidate in future examinations in order to determine which group among the minority candidates are likely to perform better on the examination. We can then focus our recruitment efforts on those specific segments of the minority population. (Note: The SD for minorities has also been greater than for non-minorities in previous examinations.)

Utility Analysis

It can be demonstrated by performing a utility analysis that the higher the passing point, the higher the overall resulting quality or effectiveness of the police departments (see Wiesen et al., 1982).

SUGGESTED PASSING SCORE

Using the data above as a guide, the passing score should ideally be set between 85 (one standard deviation below the incumbent mean) and 95 (the score which will pass a sufficient number of applicants to fill the anticipated number of openings - the psychometrically ideal passing score). This examination was easier than the 1975 IPMA examination as demonstrated by the pretest data in which the 1975 and the 1981 examinations were both given to the same group of examinees, and by the high overall mean score for the applicants on the 1981 examination as compared to the previous three examinations. Since the

examination is supported by construct, content and criterion-related validity data and since the items were selected using the 4/5 rule as a criterion for the selection of individual items for the examination (to minimize adverse impact), the examination is valid and was constructed in a manner designed to minimize adverse impact. There is no reason to lower the passing point from this ideal range due to lingering questions about the validity or fairness of the examination.

However, since a passing score above 70% is unprecedented in the Commonwealth, a passing score of 70% may be required for administrative reasons concerning acceptance by applicants, police appointing authorities, and the police community. A passing score of 70% would yield a ratio of minority to non-minority passing rates of .69 which is the highest ratio for a passing score for all the police examinations in the last 7 years (higher than the 1975, 1978 and 1979 examinations.) If administrative considerations require a lowering of the passing score to 70%, we point out that this will decrease the utility of the examination to the extent that persons are not selected in order of their score on the examination. Since many departments appoint persons in the order in which their names appear on the list, with the highest name receiving the first offer of appointment, a change in the passing score will not have the debilitating effect it might otherwise have on the utility of the examination. Utility will be lowered to the extent that a lower passing score results in the appointment of lower scoring applicants.

Parenthetically it must be acknowledged that no test is a perfect predictor of future job performance (although cognitive tests are the best predictors available now, far better than interviews - see, for example Landy and Trumbo, 1980). Any individual's score may not be a good predictor of job performance for any of many reasons, such as: poor test performance due to personal problems on the day of the exam (e.g., illness), unusually high motivation (although we can not measure the reliability), or even particularly lucky guessing on the exam. Nevertheless, strong statements may be made about the overall utility of an examination based on the past history of appointment of applicants (see Wiesen, et al., 1982). It is impossible that every, or even many of the applicants can be exceptions to this general rule. Therefore, adherence to the general finding that higher test performance is indicative of better future job performance is the only basis for the establishment of this civil service register.

In summary, the 1981 examination is supported by construct, content and criterion-related validity, and/considerable effort was made during test construction to minimize adverse impact on minority applicants. A passing point higher than 70% (as high as 95%) would be psychometrically defensible, maximally utilitarian and, thus, managerially ideal; and a passing point of 85% would be in the spirit of the Uniform Guidelines (as they relate to a reasonable expectation

of proficiency in the workforce). However, since there is a general belief that "70% is passing", it would be administratively difficult to set a cut score above 70%. Finally, the general practice of appointing from the top of a civil service register will tend to maintain the utility of the examination, no matter where the passing point is set. So in this respect, and given the administrative constraints, 70% is a defensible passing score.

CONCLUSION

In conclusion, the 1981 Police Services Examination is a valid examination which is supported by content, criterion-related and construct validity. In addition the construction of the examination incorporated an effort to statistically reduce adverse impact by selecting items which had been pretested and which yielded an 80% minority to non-minority by success ratio. Since the examination is valid and since, in general, an examination's utility is increased with a higher the passing point, a passing point of 80 is most justified psychometrically. However, given administrative constraints, that is, past precedent, a passing point of 70% is recommended. A passing point of 70% would maintain the basic integrity of the examination and yield the highest minority to non-minority ratio that has existed for the last three Police Services Examinations (see Table L). Further evaluation of the effects of recruitment on the passing rate for minority candidates is suggested to help direct recruitment efforts to the most fruitful sources of qualified minority applicants.

References

Buros, O.K. ed., The Seventh Mental Measurement Yearbook. Highland Park, N. J.: The Gryphon Press, 1972.

Castro vs. Beecher, "Appeals from the United States District Court for the District of Massachusetts" U.S. Court of Appeals for the First Circuit. #71-1180, 71-1395, 71-1396 4/26/72.

Castro vs. Beecher, Consent Decree and Final Judgement. U.S. District Court for the District of Massachusetts. Civil Action No. 70-1220-w, April 15, 1973.

Davey, B. Readability: Why It's Important, How to Measure It, How to Improve It. Connecticut Department of Personnel and Administration, 1975.

Dawes, R.M. The Robust beauty of improper linear models in decision making. American Psychologist, 1979, 34, 571-582.

Ekstrom, R., French, J., Herman, H. and Dermen, D., Manual for Kit of Factor-Referenced Cognitive Tests. Princeton, N. J.: Educational Testing Service, 1973.

Equal Employment Opportunity Commission, Civil Service Commission; Department of Labor, Department of Justice. Adoption by Four Agencies of Uniform Guidelines On Employee Selection Procedures. Federal Register, 1978, Vol. 43, 38290-38315.

Flaughter, R., Nieves, L., Slaughter, C., Wiesen, J. P., Woodford, P., Guidelines for the Identification and Elimination of Test Bias on Standardized Tests, prepared by Educational Testing Service, Princeton, N. J. Boston MA: Division of Personnel Administration, Commonwealth of Massachusetts, 1979.

Fleishman, E. A., Theologus, G. G., Romashko, T. Development of a Taxonomy of Human Performance: A Feasibility Study of Ability Dimensions for Classifying Human Tasks. Washington, D.C.: American Institute for Research, 1970.

Guilford, J. P., & Fruchter, B. Fundamental Statistics in Psychology and Education (5th ed.). New York: McGraw-Hill, 1973.

Gunning, R., The Technique of Clear Writing. New York: McGraw-Hill, 1968.

Keppel, G., Design and Analysis: A Researcher's Handbook. Englewood Cliffs, New Jersey: Prentice Hall, 1973

Landy, F. J. and Trumbo, D. A., Psychology of Work Behavior. Dorsey Press, Homewood, Illinois: Dorsey Press 1980.

Morton, A., Wasserman, R. and Hokanson, C. L., Development of a Proposed Curriculum for Training Basic Police Officers in Massachusetts. Boston, MA.: Arthur D. Little Inc. 1979. (ADL ref. no. 82168).

Remus, W. E., Measures of fit for unit rules. American Psychologist, 1980, 35, 678-680.

Rosenfeld, M. and Thornton, R. F., The Development and Validation of a Fire Fighter Selection Examination for the City of Philadelphia. Princeton, N. J.: Educational Testing Service, 1976.

Wallack, J., Clancy J. J. and Beals, S., The Validation of Entry-Level Law Enforcement Examination in the States of California and Nevada. Sacramento, CA.: The Selection Consulting Center, 1973.

Wiesen, J. P., Kita, J. A., Rice, C., Macdowall, R. S., Ashton, D. P., Garrity, M. E., Validation of the 1975 Police Services Examination For The Commonwealth of Massachusetts. Boston, MA: Department of Personnel Administration, Commonwealth of Massachusetts, 1982.

APPENDIX A

Revised Ability Rating and Linkage Form

STEP I

ABILITY 10: MEMORY FOR RELATIONSHIPS

DIRECTIONS: Indicate which Police Officer tasks definitely require this ability. Please include comments next to each task telling why you feel the task requires this ability.

DEFINITION: The ability to recall logical connections or relationships among previously learned items, such as operating procedures. For example, remembering the sequence of actions in CPR based on the logical relationship of the actions; first check for breathing, if person is breathing then the heart must be beating and no CPR is needed.

TASKS

COMMENTS

INSTRUCTIONS: Refresh your memory of the seven roles. Then rate the above ability in terms of its contribution to the successful performance of a police officer in each of the seven roles. Indicate your rating by writing the appropriate scale value on the black line next to each role.

SCALE VALUES

- | | |
|-----------------------|---------------------|
| 1. Irrelevant | 5. Important |
| 2. Not Important | 6. Very Important |
| 3. Slightly Important | 7. Great Importance |
| 4. Some Importance | 8. Critical |

SEVEN ROLES

- | | | |
|--|----|-------|
| 1. Patrol | 1. | _____ |
| 2. Providing Services and Rendering Assistance | 2. | _____ |
| 3. Applying and Enforcing the Law | 3. | _____ |
| 4. Investigating | 4. | _____ |
| 5. Assisting in Prosecution | 5. | _____ |
| 6. Documenting and Recording | 6. | _____ |
| 7. Miscellaneous | 7. | _____ |

STEP I

ABILITY 18: CATEGORY FLEXIBILITY

DIRECTIONS: Indicate which Police Officer tasks definitely require this ability. Please include comments next to each task telling why you feel the task requires this ability.

DEFINITION: That type of problem solving which involves thinking of and applying different ways of grouping a given set of information, or a set of information which is already well known.

TASKS

COMMENTS

INSTRUCTIONS: Refresh your memory of the seven roles. Then rate the above ability in terms of its contribution to the successful performance of a police officer in each of the seven roles. Indicate your rating by writing the appropriate scale value on the black line next to each role.

SCALE VALUES

- | | |
|-----------------------|---------------------|
| 1. Irrelevant | 5. Important |
| 2. Not Important | 6. Very Important |
| 3. Slightly Important | 7. Great Importance |
| 4. Some Importance | 8. Critical |

SEVEN ROLES

- | | | |
|--|----|-------|
| 1. Patrol | 1. | _____ |
| 2. Providing Services and Rendering Assistance | 2. | _____ |
| 3. Applying and Enforcing the Law | 3. | _____ |
| 4. Investigating | 4. | _____ |
| 5. Assisting in Prosecution | 5. | _____ |
| 6. Documenting and Recording | 6. | _____ |
| 7. Miscellaneous | 7. | _____ |

STEP 1

ABILITY 25: SPEED OF PERCEPTION

DIRECTIONS: Indicate which Police Officer tasks definitely require this ability. Please include comments next to each task telling why you feel the task requires this ability.

DEFINITION: The ability to quickly make comparisons in order to determine the identity or degree of similarity of objects. These comparisons may be made between pairs of objects presented simultaneously or closely in time. Alternatively, the comparisons may be made between a presented object and a remembered or standard object or set of objects. The sets of objects to be compared must be in the same sense. (e.g. auditory)

TASKS	COMMENTS

INSTRUCTIONS: Refresh your memory of the seven roles. Then rate the above ability in terms of its contribution to the successful performance of a police officer in each of the seven roles. Indicate your rating by writing the appropriate scale value on the black line next to each role.

SCALE VALUES

1. Irrelevant

2. Not Important

3. Slightly Important

4. Some Importance
5. Important

6. Very Important

7. Great Importance

8. Critical

SEVEN ROLES

1. Patrol

2. Providing Services and Rendering Assistance

3. Applying and Enforcing the Law

4. Investigating

5. Assisting in Prosecution

6. Documenting and Recording

7. Miscellaneous
1.

2.

3.

4.

5.

6.

7.
- _____

ABILITY 29: INTERPRETATION OF HYPOTHETICAL RULES AND REGULATIONS

DEFINITION: The ability to read and interpret rules and regulations such as those of a police department.

TASKS	COMMENTS

SCALE VALUES

- | | |
|-----------------------|---------------------|
| 1. Irrelevant | 5. Important |
| 2. Not Important | 6. Very Important |
| 3. Slightly Important | 7. Great Importance |
| 4. Some Importance | 8. Critical |

SEVEN ROLES

- | | | | |
|----|---|----|-------|
| 1. | Patrol | 1. | _____ |
| 2. | Providing Services and Rendering Assistance | 2. | _____ |
| 3. | Applying and Enforcing the Law | 3. | _____ |
| 4. | Investigating | 4. | _____ |
| 5. | Assisting in Prosecution | 5. | _____ |
| 6. | Documenting and Recording | 6. | _____ |
| 7. | Miscellaneous | 7. | _____ |

APPENDIX B

Examination Announcement

Massachusetts Division of Personnel Administration



OPEN COMPETITIVE EXAMINATION

Last date for filing
applications: October 23, 1981

Exam Date: November 14, 1981

AMENDED NOTICE: Change in Exam Date; Last Filing Date.

POLICE SERVICES

Including Any or All of the Following:
POLICE OFFICER, MUNICIPAL SERVICES
CAPITOL POLICE OFFICER
METROPOLITAN POLICE PATROLMAN
M.B.T.A. PATROLMAN

The results of this examination will be used to establish and maintain a list of eligible candidates from which names may be certified to fill vacancies in the position of Police Officer or similar positions, however designated, in the police departments of cities and of such towns as are classified under Civil Service; in the police force of the Metropolitan District Commission; in the Capitol Police Force of the Bureau of State Buildings; and in the Police Department of the Massachusetts Bay Transit Authority.

SALARIES: The minimum salaries for positions in State Service are as follows:

Capitol Police Officer: \$11,378.36 per year.

Metropolitan Police Patrolman: \$11,378.36 per year.

M.B.T.A. Patrolman: \$16,641.64 per year.

These salaries may vary depending upon the compensation plan in effect at time of appointment due to collective bargaining agreements.

In Cities and Towns, the salary for Police Officer will vary depending upon the compensation plans of the various cities and towns. Inquiry concerning salary should be directed to the appointing authority.

HOW TO APPLY

Application cards (Form 1) may be obtained from and filed at, in person or by mail:

Division of Personnel Administration
Information Center—Second Floor
One Ashburton Place
Boston, Massachusetts 02108

Call: Boston Area: 727-4370
Outside the Boston Area,
Toll Free: 1-800-392-6179

Applications may also be obtained from any of the local Civil Service Representatives listed on the back of this poster, and filed by mail.

ALL APPLICATIONS MUST BE FILED IN PERSON OR BY MAIL AT THE DIVISION OF PERSONNEL ADMINISTRATION.

All correspondence should be sent by certified mail.

FOR ADDITIONAL INFORMATION,
PLEASE SEE OTHER SIDE.

ENTRANCE REQUIREMENTS: The examination is open to males and females who are at least nineteen (19) years old and not yet thirty-two (32) years old at the time of application. A birth certificate must be filed at the time of application. However, if a birth certificate can not be obtained, the applicant must agree at the time of application to provide proof of birth date to satisfy this requirement prior to certification.

MEDICAL: Applicants must pass a medical examination administered by the Division of Personnel Administration. A pre-employment medical examination may be required by the Appointing Authority. The medical examination may include a psychological evaluation.

EDUCATION: Applicants must have graduated from high school, or must possess an equivalency certificate issued by the Massachusetts Department of Education, or must have served at least three years in the armed forces of the United States, the last discharge or release from which must have been under honorable conditions.

DRIVER'S LICENSE: Possession of a valid and current Massachusetts motor vehicle operator's license is required for certification for appointment to the Metropolitan, Capitol and M.B.T.A. Police Departments. Such license may also be required by the municipalities. Inquiry concerning this requirement should be directed to the appointing authority.

CHARACTER: No person who has been convicted of any felony shall be appointed as a police officer. A candidate may be disqualified for character clearly unsuited for police services, following a hearing by the Personnel Administrator.

HEIGHT REQUIREMENT: There will be no minimum height requirement unless the Personnel Administrator has approved a request made by a municipality for a minimum height requirement. Applicants will be notified if any such request has been approved.

CLAIMS FOR PREFERENCE

SPECIAL PREFERENCE: If you claim preference as the son or daughter of a police officer or fire fighter who was killed or died of injuries received in the performance of duty under the provisions of Sec. 26 of Chap. 31 of the General Laws, you must submit substantiating proof from official sources.

RESIDENCY PREFERENCE: Many municipalities give preference to those candidates who have been residents of the municipality for the year before the date of the examination; they shall be listed first on the eligible list.

CONTINUED ON REVERSE SIDE

EQUAL OPPORTUNITY EMPLOYER

GENERAL INFORMATION

Applications may be obtained from the Civil Service Representatives in the city or town halls of the following municipalities:

Attleboro (Annex Bldg.)	Lowell
Brockton	Marlboro
Chicopee	New Bedford
Fall River	North Adams
Fitchburg	Northampton
Gloucester	Pittsfield
Greenfield*	Springfield
Holyoke (Annex Bldg.)	Worcester
Lawrence	

*In Greenfield, applications are available at the Fire Department.

Local representatives do not accept applications. Instructions for filing are on the front under "How to Apply". Please check the filing date to ensure that your application arrives on time. You will receive notice of the date of the examination, an application (Form 1E), and any necessary instructions.

The following examination centers and code numbers are to be used on your application. These examination centers will be used only if a sufficient number of applicants select them.

Boston.....807	Medford.....834
Brockton.....530	New Bedford.....644
Breokline.....841	Norwood.....609
Cambridge.....838	Pittsfield.....112
Fall River.....541	Quincy.....812
Lawrence.....511	Salem.....527
Lowell.....411	Springfield.....249
Lynn.....526	Worcester.....333

Test results will be sent to all persons taking the examination.

NOTE: This examination is open to residents of the United States who are otherwise eligible.

NOTE: Most recent score will determine an applicant's position on the eligible list. Applicants failing the most recent examination will be removed from the list regardless of previous score.

DISABLED AND REGULAR VETERAN'S PREFERENCE: If you wish to claim Veteran's Preference, you MUST file a copy of your discharge or release (DD-214) at the time of the examination. If you wish to claim Disabled Veteran's Preference and you have claimed this preference on your application, you will receive a release of medical records information form for the Veterans' Administration when you are notified of your passing mark. If you claim preference as the spouse or single parent of a veteran under the provisions of Section 26 of Chapter 31 of the Massachusetts General Laws, you must submit proof from official sources of such facts substantiating your claim under the above provisions of law.

WRITTEN EXAMINATION: Applicants must pass a written examination. This examination will consist of multiple choice questions which test for abilities required for success as a police officer. Questions will test mental abilities such as interpretation of hypothetical rules and regulations, verbal reasoning, number series, table interpretation and reading comprehension.

SPANISH EXAMINATION: The examination may also be taken in Spanish. Applicants who take the examination in Spanish will have to pass an additional examination that will test the ability to read and understand the English language.

ORIENTATION BOOKLET: For a more detailed description of the examination, all applicants are encouraged to refer to the "Entry Level Police Service Examination Orientation Booklet" which may be obtained at the Information Center, Second Floor, One Ashburton Place, Boston, Massachusetts 02108.

JOB DESCRIPTION: A police officer works to protect life, property and the civil rights of individuals through enforcement of laws and ordinances. The police officer's work is performed under supervision in accordance with well established police practice and departmental regulations. The job frequently involves the performance of hazardous tasks and the exercise of initiative and judgment in emergency situations which might endanger life and property. No supervision is exercised over other employees. The duties may be divided into several major areas: **PATROLLING:** [driving or acting as observer in a patrol car; using a radio or walkie-talkie; establishing and maintaining relationships with citizens while on a beat; checking doors and windows of business establishments and unoccupied dwellings; observing suspicious persons and activities likely to lead to criminal acts]; **PROVIDING SERVICE AND RENDERING ASSISTANCE:** [responding to motor vehicle accidents, domestic disputes and disabled vehicles; assisting or handling intoxicated individual or individual who are either mentally ill, highly emotional or deranged; advising individuals on specific law(s), statute(s), code(s), ordinance(s) and criminal justice procedures; giving general information to individuals; administering first aid and cardio-pulmonary resuscitation; taking custody of property; controlling flow of pedestrians and traffic]; **APPLYING AND ENFORCING THE LAW:** [issuing oral and/or written warnings or citations to individuals violating the law; responding to crimes; encouraging individuals to comply with the law; making arrests without the use of force; operating a revolver or other weapon; pursuing violators of the law by vehicle; engaging in self-defense; applying apprehension and search techniques]; **INVESTIGATING:** [interviewing complainants or victims; taking statements from witnesses; investigating or observing suspicious person(s) and circumstances; investigating traffic accidents; conducting or participating in the initial investigation of crimes; searching suspects, vehicles and premises; performing security techniques at the scene of a crime]; **ASSISTING IN PROSECUTION:** [preparing for court appearances; testifying in court; serving subpoenas, summonses and warrants; acquiring and maintaining chain of custody of evidence; conducting, booking and searching operations at the station]; **DOCUMENTING AND RECORDING:** [writing, typing, dictating reports on what was done on duty; completing departmental or court forms; maintaining a personal notebook]; **MISCELLANEOUS:** [recognizing abnormal or unusual situations; performing other related duties as required].

APPENDIX C

Sample of Qualitative Ability-Job Behavior Data:
Job Behaviors Requiring Specific Abilities

ABILITY 2: READING

<u>TASKS</u>	<u>COMMENTS</u>
1. Reading reports Orders of the Days Interpreting Laws Memos Directions Accident reports Investigations of others Being able to intimidate	Must interpret laws Memos - orders written Must understand civilian reports Almost as important as speaking
	Self-evident - next to the spoken word, we deal with written communication. Anyone in any walk of life, must be able to read, interpret and understand the written word.
2. Have to look up laws in books. Be able to read them to get the meaning of the law, what facts you have to have to apply that law to your case.	Reports Criminal Law Follow up investigations
3. Rules and regulations memos that come out in regards to what has been taking place high crime areas.	
4. Being able to read reports	
5. Orders of the day	
6. Rules and regulations	
7. Laws	
8. Being able to make out custody reports and all other reports, etc. accident reports - larceny - investigation reports	
9. Investigating	The ability to cross reference other P.O's reports which are relative to your investigation

ABILITY 2: READING

<u>TASKS</u>	<u>COMMENTS</u>
10. Rules and regulations	Understanding them
11. Interpreting written law	
12. Criminal Law	Ability to interpret the laws
13. Investigations	Cyphering informations
14. Reports	Understand meaning
15. Rules and regulations	Know what your function is
16. Must read all orders and bulletins	
17. Must read all laws and amendments	
18. Must read and interpret written reports submitted by non-police personnel - (accidents)	
19. Must read daily log as to what has occurred on recent shifts.	
20. Police reports motor vehicle number plates newspapers	must be able to read and understand If you can read and understand it can be an insight to some of the reasons for crime in your particular area.
21. Be able to read written orders given by superior officers	
22. Must have the ability to understand and read laws.	
23. Written orders, etc.	
24. Evidence could be written	You must have the ability to read as you could have to have the ability to communicate in order for the department to function.

ABILITY 2: READING

<u>TASKS</u>	<u>COMMENTS</u>
25. Booking suspects	Crimes charged agree with general laws and statutes
26. Rules and regulations	job requirement
27. Directives from Chief or Superiors	Many orders are written rather than oral.
28. Threatening letters	
29. Reading directives	Job knowledge
30. S. O. P. - rules and regulations	Job knowledge
31. Miranda warning to citizens under arrest	Its best to read it, for statement in court.
32. Taking exams	getting info
33. Understanding climate in jurisdiction by reading local papers, etc.	Ability to function
34. Changes in laws	updating knowledge

ABILITY 4: WRITING

TASKS

COMMENTS

A p.o. must use language when writing so that others may understand, to enable that person to take over an investigation clearly given written orders or memos.

1. Reports
Investigations
Directions
Letters

Another important means of expressing oneself.

2. Reports, etc.

Basic command of language, grammar, punctuation

3. Court reports
Accident reports
Record keeping
Public relations
Writing awards to people for what they have done to make your job easier

Leave something out in your report, could lose the case, or if someone follows up on your report, have to be put in a way that someone else that never had anything to do with case is now taking over the investigation. Wants to know what you have done.

4. Being able to put down what you would like to say

5. Be able to communicate by writing.

6. All types of reports

7. Interviewing witnesses and making out reports

8. Reports

9. Obtaining warrants

10. Written communications between other agencies

11. Accident reports

12. Citations (motor vehicle)

ABILITY 7: TASK MEMORY

<u>TASKS</u>	<u>COMMENTS</u>
1. Rules - Regulations	Must be able to remember rules and regulations in order to perform duties accurately and correctly.
2. Laws, ordinances, by laws	Be able to perform duties and enforce same
3. Firearms	Ability to remember proper use and care
4. Past criminals or acquaintances	To be able to recognize them and be able to remember their M.O. which can be an investigative technique The ability to remember and to have recall is most important in police work.
5. Could be looking for a criminal	
6. Must have recall at court	
7. Must remember the laws	
8. You need to remember certain information in order to carry out the police mission.	
9. Names, Places	To avoid false actions
10. Emergency phone numbers, facilities	To be able to save time in a given situation
11. Dignitaries	To avoid false actions
12. Changes in S.O.P.	For the organization to be in sync - a uniform procedure must be carried out. ex. Directive on uniform change from winter wear to spring wear
13. Rules and regulations	
14. Laws	

ABILITY 7: TASK MEMORY

<u>TASKS</u>	<u>COMMENTS</u>
15. Searching for suspects	
16. Interviewing of witnesses	
17. General patrol	Receiving information and applying it to old information
18. Crimes committed	ability to recall chain of events
19. Communications	information relayed from another source in radio or telephone communication
20. Receiving orders at start of shift	
21. Questioning witnesses	
22. Obtaining useful info by speaking to general public	

ABILITY 8: SPAN MEMORY

<u>TASKS</u>	<u>COMMENTS</u>
1. Motor vehicles	You may be given a list of motor vehicles and registration numbers that have been stolen or have to be checked.
2. Telephone and communications	You may receive 3 - 4 calls at short intervals and you must remember the contents of each call so that other officers can be dispatched or need more information The ability to recall a series of items after one or more presentations of the series could be important for a court case.
3. Court procedure	Recollection
4. Suspects	Identifying features
5. Automobiles	Stolen or used in commission of crime
6. Accidents	Law suits
7. License numbers	NCIC info.
8. Stolen property list	identification
9. Telephone numbers	info

ABILITY 11: MEMORY FOR IDEAS

<u>TASK</u>	<u>COMMENTS</u>
1. Log sheets Testimony one to another remembering rules and regulations - orders of the day.	
2. General laws	Interpret laws
3. Rules and Regulations	Such as uniform change
4. Memos	Understand important changes.
5. Remembering general laws and motor vehicle laws	
6. Remembering bulletins and notices	
7. Remembering the daily log.	

ABILITY 29: INTERPRETATION OF HYPOTHETICAL
RULES AND REGULATIONS

<u>TASKS</u>	<u>COMMENTS</u>
1. Reading and interpreting rules and regulations rates with abilities through for in importance and would seem to surpass as this is the backbone of police conduct.	
2. Arrest procedure Desk procedure	This ability is absolutely necessary

APPENDIX D

Instructions For The Fog Readability Index

INSTRUCTIONS FOR COMPUTING THE FOG READABILITY INDEX*

(PROSE PASSAGES)

1. TOTAL NUMBER OF WORDS - Samples of any length may be used. Count as a word all numbers, letters, or symbols that are separated (singly or in groups) from each other by blank spaces.
2. TOTAL NUMBER OF SENTENCES- For the purposes of the Fog sentence count, a sentence is defined as a grammatically independent unit of thought regardless of the number of words it contains. Hence, the Fog sentence count is equal to the total number of independent clauses in the sample. A compound sentence, for example, would be counted as two sentences.
3. AVERAGE SENTENCE LENGTH- Divide the total number of words by the total number of sentences to get the average sentence length, that is, the average number of words per sentence.
4. TOTAL NUMBER OF HARD WORDS- Count the number of words of three or more syllables. If a hard word is repeated, count each repetition. Do not count as hard words: (1) capitalized names or titles, (2) abbreviations, (3) numerals or words representing them, (4) compound or hyphenated words ("inasmuch," bookkeeper," or "right-handed") when the components themselves are not polysyllabic, or (5) verbs made polysyllabic by adding -ed ("created") or -es ("Trespasses").
5. PERCENTAGE OF HARD WORDS - Divide the total number of hard words (#4) by the total number of words in the sample (#1), then multiply the quotient by 100 to get the percentage of hard words in the sample.
6. SUM OF #3 AND #5 ABOVE - Add the average sentence length (#3) to the percentage of hard words (#5).
7. FOG INDEX- Multiply #6 above by 0.4 to get the Fog Index. The Fog Index is roughly equivalent to a reading level by grade.

*These instructions are derived from Robert Gunning, The Technique of Clear Writing, (New York: McGraw-Hill Book Company, 1968), pp. 31-45 and 277-282.

NOTES

1. Polysyllabic words that may be considered part of the trade jargon of the position for which the examination is being held should be counted as hard words even though we can reasonably expect that the candidates would be familiar with the terminology of their respective fields. Including these polysyllabic trade words in the hard word count will certainly result in a higher reading level than otherwise, but if the reading level is higher than the pre-determined reading level for the examination, it should be lowered by eliminating the non-trade polysyllabic words.
2. Note that a compound or hyphenated word to be excepted from the hard word count must contain at least two free morphemes, that is, contain at least two base words that can stand alone. For example, the word "understand" should be excepted from the hard word count because it is made up of two words ("under" and "stand") that can stand alone, but the word "willfulness" should be treated as a hard word because it is composed of only one free morpheme ("will") and of two bound morphemes (the derivational suffixes "-ful" and "-ness").

INSTRUCTIONS FOR COMPUTING THE FOG READABILITY INDEX
(Multiple-Choice Test Items)

1. Follow the same instructions as for prose-passages, but choose only one of the options to complete the last sentence of the premise. The options should be of relatively uniform length and have roughly the same syntactic complexity and polysyllabic word load. Since this is not always possible, I would suggest using the longest option or the option with the greatest number of polysyllabic words in order to measure the highest reading level of the test item.
2. Include all polysyllabic trade words in the hard word count.
3. You should compute the reading level of individual test items of varying lengths randomly selected from each of the examination subject areas to get an average reading level for the entire examination.
4. Some test items will measure higher whereas others will measure much lower than the predetermined reading level for the examination. The important thing is to achieve an average reading level appropriate to the position for which the examination is being held. As much as possible, the reading level of individual test items should be fairly close to the predetermined reading level for the examination.
5. Elementary and high school students often have difficulty reading textbooks designated for their grade levels. The reason for this is that although publishers claim that a particular school text is written at a certain grade level, they really mean that the average reading level of the text is at the grade level indicated and not that each chapter of the book is written at the same grade level. Hence, students often cannot handle some of the chapters of their textbooks especially if they are reading below grade level to start with. This situation is often recreated in written examination. As long as the higher reading level is warranted by the nature of the examination subjects, I see no problem, but when the reading level is higher than it should be, a disservice has been done to the applicants.
6. Since we do not have any control over the reading level of on-the-job written materials (such as the General Laws or departmental rules and regulations, which tend on the whole to measure quite high and be somewhat unreadable), they should perhaps be excluded when computing the average reading level of the examination or at least considered separately from the test items.

APPENDIX E
Readability Analyses

TABLE 1

The Reading Grade Level of Reading Materials
Used at the Boston Police Academy as Calculated
by Fog Index

	<u>Page#</u>	<u>Fog Indexes</u>
Basic Criminal Law for Police Officers	28	16.18
	34	14.85
Family Crisis Intervention	66	15.63
Rape Crisis Training	26	15.28
	74	16.5
Constitutional Law	6	16.50
	10	17.16
Investigative Materials	8	17.15
	58	14.72
Court Procedures for Police Officers	5	14.65
Constitutional Issues in Law Enforcement	10	15.55
	23	14.49
Criminal Investigative Procedures	5	18.54
	85	10.36
Average Reading Level		15.54

TABLE 2

Reading Levels of Reading Passages
in the 1981 Examination

Memory	8.97
Departmental Orders	
The Memo Book	8.52
Use of Tear Gas	11.64
The Patrol Car	7.12
Maintenance of Fire Lines	7.64
Women	13.68
Use of Radios and Walkie-Talkies	8.92
Prisoners	13.39
Mean Reading Level of Reading Passages = 10.13	

TABLE 3

Reading Levels For Selected Test Items
(Fog Index)

<u>Verbal Reasoning Items</u>	<u>Fog Index (Grade Level)</u>
16	9.6
17	15.3
18	6.66
19	6.88
20	8.02
21	9.79
22	9.56
23	10.86
24	8.0
25	6.91
26	8.0
27	9.47
28	6.16
29	6.34
30	14.6
31	7.86
32	7.11
33	8.0
34	9.8
35	8.16
36	7.2
37	8.66
38	8.0
39	4.56
40	7.14
41	7.09
42	10.07
43	6.47

TABLE 3 (Continued)

<u>Reading Comprehension</u>	<u>Fog Index (Grade Level)</u>
94	11.66
95	11.91
96	13.7
97	8.48
98	11.0
99	11.08
100	10.7
101	16.21
102	14.3
103	14.48
104	11.07
105	11.78
106	12.11
107	11.0
108	8.65
109	7.88
110	15.53

Mean Grade Level for Verbal Reasoning = 8.43

Mean Grade Level for Reading Comprehension = 11.85

Mean Grade Level for Verbal Reasoning and
Reading Comprehension = 9.76

APPENDIX F
Data Information Sheet

DATA INFORMATION SHEET

THESE QUESTIONS ARE DESIGNED TO PROVIDE BACKGROUND INFORMATION FOR RESEARCH PURPOSES. THESE QUESTIONS ARE NOT PART OF THE TEST. PLEASE INDICATE YOUR ANSWERS TO THESE QUESTIONS ON YOUR ANSWER SHEET. FOR EVERY QUESTION, MARK YOUR ANSWER BY FILLING IN THE SPACE BELOW THE LETTER THAT CORRESPONDS TO YOUR ANSWER. BEGIN WITH NUMBER _____.

WHAT IS YOUR SEX?

1. MALE
2. FEMALE

WHICH ONE OF THE FOLLOWING DO YOU THINK BEST DESCRIBES YOU?

3. CAUCASIAN (WHITE)
4. BLACK
5. HISPANIC
6. OTHER (NOT MENTIONED ABOVE)

WHICH ONE OF THE FOLLOWING BEST DESCRIBES YOUR HIGHEST LEVEL OF EDUCATION?

7. ELEVENTH GRADE OR LESS
8. HIGH SCHOOL GRADUATE OR HIGH SCHOOL EQUIVALENCY DIPLOMA
9. SOME COLLEGE
10. COLLEGE GRADUATE
11. POST-GRADUATE

WHAT IS YOUR AGE?

12. 18 AND UNDER
13. BETWEEN 19 AND 21
14. BETWEEN 22 AND 25
15. BETWEEN 26 AND 30
16. 31 - 32
17. 33 AND OVER

ARE YOU A VETERAN?

18. YES
19. NO

APPENDIX G

Test Evaluation Questionnaire

TEST EVALUATION QUESTIONNAIRE

We would appreciate it if you would give us your opinion of the examination you just completed.

Rate this test on the following:

1. Clarity of the instructions.

2. Fairness to all ethnic, racial and religious groups.

3. Overall rating.

EXCELLENT

GOOD

MEDIOCRE

POOR

DON'T KNOW
OR CAN'T DECIDE

How many test items could be described in the following ways?

4. Had a confusing question.

5. Had ambiguous answers.

6. Had no correct answer.

7. Were too difficult for the job level.

8. Were too easy for the job level.

9. Required knowledges, skills or abilities beyond the scope of the job.

10. Had typographical errors.

NONE

A FEW

MANY

ALL

DON'T KNOW
OR CAN'T DECIDE

(OVER)

ANY COMMENTS

APPENDIX H

Pretest Item Difficulty by Pretest Form,
Test Area and Race - Ethnicity

TABLE 1

Pretest Item Difficulty Level for Memory
Items By Race-Ethnicity, and Ratio of
Difficulty For White and Black Examinees

Item	Item Difficulty*	Item Difficulty For White Examinees Column a	Item Difficulty For Black Examinees Column b	Ratio of Difficulties Col b/Col a
1	88.1	83.8	91.5	109.
2	92.9	97.3	89.4	91.8
3	96.4	97.3	95.7	98.4
4	92.9	94.6	91.5	96.7
5	90.5	86.5	93.6	108.
6	96.4	97.3	95.7	98.4
7	90.5	94.6	87.2	92.2
8	100.	100.	100.	100.
9	85.7	91.9	80.8	88.
10	92.9	91.9	93.6	101.
11	96.4	97.3	95.7	98.4
12	96.4	94.6	97.9	103.
13	88.1	81.1	93.6	115.
14	82.1	78.4	85.1	108.
15	98.8	100.	97.9	97.9
16	98.8	97.3	97.9	100.
17	95.2	94.6	95.7	101.
18	84.5	91.9	78.7	85.7
19	96.4	94.6	97.9	103.
20	94.0	91.9	95.7	104.
21	91.7	83.8	97.9	116.
22	98.8	97.3	100.	102.
23	54.8	56.8	53.2	93.7
24	88.1	78.4	89.4	114.
25	88.1	94.6	83.0	87.7
26	83.3	83.8	83.0	99.0
27	89.3	89.2	89.4	100.
28	52.4	59.4	46.8	78.7
29	85.7	94.6	78.7	83.2
30	98.8	97.3	100.	102.
31	97.6	100.	95.7	95.7
32	91.7	91.9	91.5	99.6

*Percent of examinees who answered item correctly.

TABLE 2

Pretest Item Difficulty Level for Verbal Reasoning
(Form A) Items by Race-Ethnicity, and Ratio of
Difficulty for White and Black Examinees*

<u>Item</u>	<u>Item Difficulty**</u>	<u>Item Difficulty For White Examinees Column a</u>	<u>Item Difficulty For Black Examinees Column b</u>	<u>Ratio of Difficulties Col b/Col a</u>
1	86.9	89.2	85.5	95.9
2	54.8	59.4	51.1	85.9
3	83.3	83.8	83.0	99.0
4	86.9	83.8	89.4	106.
5	82.1	86.5	78.7	91.0
6	47.6	62.2	36.2	58.2
7	85.7	89.2	83.0	93.0
8	64.3	70.3	84.6	84.8
9	78.6	81.0	76.6	94.6
10	84.5	94.6	76.6	81.0
11	88.1	89.2	87.3	97.8
12	53.6	59.4	48.9	82.3
13	82.1	86.5	78.7	91.0
14	47.6	45.9	48.9	106.
15	53.6	70.3	40.4	57.5
16	57.1	56.8	57.4	101.
17	84.5	73.4	89.4	121.
18	86.9	86.5	87.2	100.
19	85.7	89.2	83.	93.0
20	75.0	81.0	70.2	86.7
21	78.6	83.8	74.5	88.9
22	45.2	59.4	34.	57.2
23	65.5	73.0	59.6	81.6
24	72.6	73.0	72.3	99.1
25	65.5	67.6	63.8	94.5
26	45.7	54.0	38.3	70.7
27	86.9	91.9	83.0	90.3
28	59.5	64.9	57.4	88.6

*Mean difficulty level of items selected from Form A and Form B = 82.3%.

**Percent of examinees who answered item correctly.

TABLE 3

Pretest Item Difficulty Level for Verbal Reasoning
(Form B) Items By Race-Ethnicity, and Ratio of
Difficulty for White and Black Examinees*

Item	Item Difficulty**	Item Difficulty For White Examinees Column a	Item Difficulty For Black Examinees Column b	Ratio of Difficulties Col b/Col a
1	71.0	81.0	63.0	77.8
2	89.2	91.9	87.0	94.6
3	84.3	89.2	80.4	90.2
4	90.7	91.9	71.7	78.
5	19.3	24.3	15.2	62.5
6	94.0	94.6	93.5	98.8
7	79.5	86.5	73.9	85.5
8	59.9	70.3	69.6	99.
9	74.7	81.0	69.6	85.9
10	100.	100.	100.	100.
11	81.9	89.2	76.0	85.2
12	86.7	89.2	84.8	95.0
13	66.3	70.3	63.0	89.6
14	59.9	70.3	69.6	99.9
15	71.0	78.4	65.2	83.2
16	72.3	73.0	71.7	98.3
17	79.5	83.8	76.0	90.7
18	95.2	94.6	95.6	101.
19	72.3	83.8	63.0	75.2
20	89.2	86.5	91.3	105.
21	89.2	94.6	84.8	89.6
22	84.3	83.8	84.8	101.
23	55.4	64.9	47.8	73.7
24	67.5	83.8	54.3	64.9
25	81.9	86.5	78.3	90.5
26	75.9	86.5	67.4	77.9
27	51.8	51.4	52.2	101.
28	72.3	81.0	65.2	80.5

*Mean difficulty level for items selected from Form A and Form B = 82.3%.

**Percent of examinees who answered item correctly.

TABLE 4

Pretest Item Difficulty Level for Number Series (Form B)
Items by Race-Ethnicity, and Ratio of Difficulty for
White and Black Examinees*

<u>Item</u>	<u>Item Difficulty**</u>	<u>Item Difficulty For White Examinees Column a</u>	<u>Item Difficulty For Black Examinees Column b</u>	<u>Ratio of Difficulties Col b/Col a</u>
29	55.4	73.0	41.3	56.6
30	84.3	97.3	73.9	76.0
31	65.0	81.0	52.2	64.4
32	41.0	56.8	18.3	49.8
33	91.6	97.3	87.0	89.4
34	89.2	94.6	84.8	89.6
35	75.9	91.9	63.0	68.6
36	77.1	83.8	71.7	85.6
37	90.4	94.6	87.0	91.9
38	80.7	81.0	76.0	93.8
39	80.7	91.9	71.7	78.0

TABLE 5

Pretest Item Difficulty Level for Number Series (Form A)
Items by Race-Ethnicity, and Ratio of Difficulty for
White and Black Examinees*

<u>Item</u>	<u>Item Difficulty**</u>	<u>Item Difficulty For White Examinees Column a</u>	<u>Item Difficulty For Black Examinees Column b</u>	<u>Ratio of Difficulties Col b/Col a</u>
29	73.8	83.8	66.0	78.7
30	52.4	54.0	51.1	94.5
31	77.4	91.9	66.0	71.8
32	84.5	91.9	78.7	85.7
33	84.5	94.6	76.6	81.0
34	61.9	73.0	53.2	72.9
35	72.6	83.8	63.8	76.2
36	89.3	100.	80.8	80.9
37	87.7	91.9	80.8	88.0
38	67.9	73.0	63.8	87.5
39	70.2	75.7	66.0	87.2

*Mean difficult level for items selected from Form A and Form B = 82.8%.

**Percent of examinees who answered item correctly.

TABLE 6

Pretest Item Difficulty Level for Table Interpretation
(Form B) Items by Race-Ethnicity and Ratio of Difficulty
for White and Black Examinees*

Item	Item Difficulty**	Item Difficulty For White Examinees Column a	Item Difficulty For Black Examinees Column b	Ratio of Difficulties Col b/Col a
40	79.5	81.0	78.8	97.2
41	88.0	89.2	87.0	97.5
42	89.2	89.2	89.1	99.9
43	81.9	75.7	87.0	114.
44	68.7	81.0	58.7	72.4
45	73.5	73.0	73.9	101.
46	50.6	54.0	47.8	88.6
47	48.2	54.0	43.5	80.5

TABLE 7

Pretest Item Difficulty Level for Table Interpretation
(Form A) Items by Race-Ethnicity, and Ratio of Difficulty
For White and Black Examinees***

Item	Item Difficulty**	Item Difficulty For White Examinees Column a	Item Difficulty For Black Examinees Column b	Ratio of Difficulties Col b/Col a
40	84.5	94.6	76.6	81.0
41	75.0	95.7	74.5	98.4
42	90.5	100.	83.0	83.0
43	86.9	91.9	83.0	90.3
44	81.0	83.8	78.7	94.0
45	85.7	89.2	83.0	93.0
46	89.3	91.9	87.2	94.9
47	78.6	86.5	72.3	83.6
48	88.1	89.2	87.2	97.8
49	84.5	91.9	78.7	85.7
50	91.7	97.3	87.2	89.6
51	85.7	91.9	80.8	88.0

*Mean difficulty for items selected for Form B = 85.5%.

**Percent of examinees who answered item correctly.

***Approximate mean difficulty level for items selected for Form A = 84.3%

TABLE 8
Pretest Item Difficulty Level for Departmental Order
(Rules and Regulations) (Form A) Items by
Race-Ethnicity, and Ratio of Difficulty for
White and Black Examinees*

<u>Item</u>	<u>Item</u> <u>Difficulty**</u>	<u>Item Difficulty</u> <u>For White Examinees</u> <u>Column a</u>	<u>Item Difficulty</u> <u>For Black Examinees</u> <u>Column b</u>
52	70.2	75.7	66.0
53	82.1	83.8	80.8
54	81.0	75.7	85.5
55	67.9	70.3	66.0
56	72.6	70.3	74.5
57	70.2	70.3	70.2
58	84.5	86.5	85.5
59	57.1	45.9	66.0
60	88.1	91.9	85.5
61	50.0	45.9	53.2
62	19.0	10.8	25.5
63	27.6	37.8	10.6
64	96.4	100.	93.6
65	45.2	56.8	36.2
66	66.7	81.0	53.3
67	71.4	67.6	74.5
68	35.7	35.1	36.2
69	10.7	10.8	10.6
70	77.4	83.8	72.3
71	3.6	.0	6.4
72	11.9	16.2	8.5
73	52.4	56.8	48.9
74	58.3	75.7	44.7
75	82.1	86.5	78.7

*Mean difficulty level for items selected from Form A and Form B = 80.5%.

**Percent of examinees who answered item correctly.

TABLE 9

Pretest Item Difficulty Level for Departmental Orders
(Rules and Regulations) (Form B) Items by
Race-Ethnicity, and Ratio of Difficulty for
White and Black Examinees*

Item	Item Difficulty**	Item Difficulty For White Examinees Column a	Item Difficulty For Black Examinees Column b	Ratio of Difficulties Col b/Col a
48	47.0	51.4	43.5	84.6
49	98.8	100.	97.8	97.8
50	53.0	70.3	39.1	55.7
51	33.7	40.5	28.3	69.7
52	77.1	78.4	76.0	97.0
53	47.0	45.9	47.8	104.
54	66.3	64.9	67.4	103.
55	81.9	78.4	84.8	108.
56	72.3	75.7	69.6	91.9
57	49.4	45.9	52.2	113.
58	85.5	89.2	86.6	97.1
59	85.5	86.5	84.8	98.0
60	81.9	73.0	89.1	123.
61	55.4	64.9	47.8	73.7
62	69.9	81.0	60.9	75.1
63	49.4	54.0	45.6	84.5
64	95.2	94.6	95.6	101.
65	16.9	24.3	10.9	44.6
66	38.6	37.8	39.1	103.
67	89.2	91.9	87.0	94.6
68	89.2	94.6	84.8	89.6
69	26.5	32.4	21.7	67.0

*Mean difficulty level for items selected for Form A and Form B = 80.5%.

**Percent of examinees who answered item correctly.

Table 10

Pretest Item Difficulty Level for Order Interpretation
(Form A) Items by Race-Ethnicity, and Ratio of
Difficulty for White and Black Examinees*

<u>Item</u>	<u>Item Difficulty**</u>	<u>Item Difficulty For White Examinees Column a</u>	<u>Item Difficulty For Black Examinees Column b</u>	<u>Ratio of Difficulties Col b/Col a</u>
76	83.3	89.2	78.7	88.3
77	85.7	94.6	78.7	83.2
78	89.3	94.6	85.5	90.4
79	83.3	89.2	78.7	88.3
80	58.3	75.7	44.7	59.0
81	69.0	89.2	53.2	59.6
82a	52.4	48.6	53.2	109.
83	26.2	32.4	21.3	65.6
84b	73.8	83.8	66.0	78.7
85	69.0	83.8	57.4	68.6
86	34.5	54.0	19.1	35.4
87	72.6	86.5	61.7	71.3

a - revised (82)

b - DBL. keyed (84)

*Mean difficulty level for items selected = 85.4%

**Percent of examinees who answered item correctly.

TABLE 11

Pretest Item Difficulty Level for Reading Comprehension
(Form B) Items by Race-Ethnicity, and Ratio of Difficulty for
White and Black Examinees*

<u>Item</u>	<u>Item Difficulty**</u>	<u>Item Difficulty For White Examinees Column a</u>	<u>Item Difficulty For Black Examinees Column b</u>	<u>Ratio of Difficulties Col b/Col a</u>
70a	69.9	73.0	67.4	92.4
71	41.0	40.5	41.3	101.
72	73.5	81.0	67.4	83.2
73b	67.5	64.9	69.6	107.
74	79.5	91.9	69.6	75.7
75	77.1	86.5	69.6	80.4
76	78.3	86.5	71.7	82.9
77	74.7	75.7	73.9	97.7
78	65.0	75.7	56.5	74.7
79	66.3	78.4	56.5	72.1
80	72.3	86.5	60.9	70.4
81	45.8	48.6	43.5	89.4
82	57.8	70.3	47.8	68.0
83c	67.5	64.9	69.6	107.
84	83.1	91.9	76.0	82.7
85d	51.8	48.6	54.3	111.
86	73.5	78.4	69.6	88.7

a B-70: revised C

b B-73: revised B & D

c B-83: revised C

d B-85: revised D

*Mean difficulty level for items selected from Forms A & B = 73.6%.

**Percent of examinees who answered item correctly.

TABLE 12

Pretest Item Difficulty Level for Reading Comprehension
(Form A) Items by Race-Ethnicity, and Ratio of Difficulty for
White and Black Examinees*

<u>Item</u>	<u>Item Difficulty</u>	<u>Item Difficulty For White Examinees Column a</u>	<u>Item Difficulty For Black Examinees Column b</u>	<u>Ratio of Difficulties Col b/Col a</u>
88e	64.3	67.6	61.7	91.3
89	71.4	86.5	59.7	69.0
90f	58.3	56.8	59.7	105.
91	81.0	89.2	74.5	83.5
92	72.6	91.9	57.4	62.5
93g	38.1	35.2	40.4	115.
94	77.4	81.0	74.5	91.9
95	54.8	59.4	53.2	89.5
96	60.7	73.0	51.1	70.0
97	76.2	59.4	68.1	114.
98	48.8	43.0	44.7	82.7
99	60.7	70.3	53.2	75.7
100	9.5	5.4	12.8	23.6
101	82.1	89.2	76.6	85.9
102	32.1	43.2	23.2	54.1
103	61.9	70.3	55.3	78.7
104	27.4	24.3	31.9	131.

e A-88: revised D

f A-90: revised A & C

g A-93: revised C & D

*Mean difficulty level for items selected from Forms A and B = 73.6%.

**Percent of examinees who answered item correctly

TABLE 13

Pretest Item Difficulty Level for Human Relations
(Form B) Items by Race-Ethnicity, and Ratio of Difficulty for
White and Black Examinees*

<u>Item</u>	<u>Item Difficulty**</u>	<u>Item Difficulty For White Examinees Column a</u>	<u>Item Difficulty For Black Examinees Column b</u>	<u>Ratio of Difficulties Col b/Col a</u>
87	45.8	40.5	50.0	123.
88	89.2	89.2	89.1	99.9
89	75.9	75.7	76.0	100.
90	54.2	48.6	58.7	120.
91	75.9	81.0	71.7	88.6
92	39.8	37.8	41.3	109.
93	89.2	94.6	84.8	89.6
94	83.1	86.5	80.4	93.0
95	84.3	89.2	80.4	90.2
96	92.8	97.3	89.1	91.6
97	51.8	51.4	52.2	101.
98	73.5	70.3	76.0	108.
99	36.1	43.2	30.4	70.4
100	48.2	32.4	60.9	187.
101	83.1	83.8	82.6	98.6

*Mean difficulty level for items selected from Forms A and B = 84.7%.

**Percent of examinees who answered item correctly.

TABLE 14

Pretest Item Difficulty Level for Human Relations
(Form A) Items by Race-Ethnicity, and Ratio of Difficulty for
White and Black Examinees*

<u>Item</u>	<u>Item Difficulty**</u>	<u>Item Difficulty For White Examinees Column a</u>	<u>Item Difficulty For Black Examinees Column b</u>	<u>Ratio of Difficulties Col b/Col a</u>
105	92.9	89.2	95.7	107.
106	66.7	67.6	66.0	97.6
107	67.9	73.0	63.8	87.5
108	72.6	81.0	66.0	81.4
109	90.5	97.3	85.5	87.9
110	82.1	86.5	78.7	91.0
111	84.5	89.2	80.8	90.6
112	67.9	59.4	74.5	125.
113	77.4	78.4	76.6	97.7
114	76.2	75.7	76.6	101.
115	95.2	100.	91.5	91.5
116	33.3	40.5	27.6	68.2
117	89.3	89.2	89.4	100.
118	90.5	94.6	87.2	92.2
119	40.5	40.5	40.4	99.7

*Mean difficulty level for items selected from Forms A & B = 84.7%.

**Percent of examinees who answered item correctly.

APPENDIX I

Pretest Item Difficulty for
Items Selected for Inclusion in the
1981 Police Services Examination

TABLE 1

Pretest Item Difficulty Level for Items Selected
for Inclusion in the Experimental and Live
1981 Police Services Examination

<u>Final Items</u>	<u>Pretest Form and Item Number*</u>	<u>Item Difficulty**</u>	<u>Ratio of Black to White Difficulties**</u>
1	1- 1	88.1	109.
2	1- 2	92.9	91.8
3	1- 4	92.9	96.7
4	1- 5	90.5	108.
5	1- 7	90.5	92.2
6	1- 9	85.7	88.0
7	1- 10	92.9	101.
8	1- 13	88.1	115.
9	1- 14	82.1	108.
10	1- 20	94.0	104.
11	1- 24	88.1	114.
12	1- 25	88.1	87.7
13	1- 26	83.3	99.0
14	1- 27	89.3	100.
15	1- 32	91.7	99.6
16	A- 1	86.9	95.9
17	A- 11	88.1	97.8
18	A- 10	84.5	81.0
19	A- 9	78.6	94.6
20	A- 7	85.7	93.0
21	A- 3	83.3	99.0
22	A- 4	86.9	106.
23	A- 5	82.1	91.0
24	A- 19	85.7	93.0
25	A- 18	86.9	100.
26	A- 17	84.5	121.
27	A- 28	59.5	88.6
28	A- 13	82.1	91.0
29	A- 21	78.6	88.9
30	A- 24	72.6	99.1
31	B- 2	89.2	94.6
32	B- 6	94.0	98.8
33	B- 7	79.5	85.5
34	B- 9	74.7	85.9
35	B- 11	81.9	85.2
36	B- 12	86.7	95.0
37	B- 16	72.3	98.3
38	B- 17	79.5	90.7
39	B- 18	95.2	101.
40	B- 20	89.2	105.

TABLE 1 (Continued)

<u>Final Items</u>	<u>Pretest Form and Item Number*</u>	<u>Item Difficulty**</u>	<u>Ratio of Black to White Difficulties**</u>
41	B- 22	84.3	101.
42	B- 25	81.9	90.5
43	B- 28	72.3	80.5
44	A- 32	84.5	85.7
45	A- 33	84.5	81.0
46	A- 36	89.3	80.8
47	A- 37	85.7	88.0
48	A- 38	67.9	87.5
49	A- 39	70.2	87.2
50	B- 33	91.6	89.4
51	B- 36	77.1	85.6
52	B- 34	89.2	89.6
53	B- 37	90.4	91.9
54	B- 38	80.7	93.8
55	A- 42	90.5	83.0
56	A- 43	86.9	90.3
57	A- 45	85.7	93.0
58	A- 46	89.3	94.9
59	A- 49	84.5	85.7
60	B- 41	88.0	97.5
61	B- 42	89.2	99.9
62	B- 43	81.9	114.
63	B- 45	73.5	101.
64	B- 45	73.5	101.
65	A- 53	82.1	96.5
66	A- 54	81.0	113.
67	A- 55	67.9	93.8
68	A- 56	72.6	105.
69	A- 57	70.2	99.9
70	A- 58	84.5	98.9
71	A- 59	57.1	143.
72	A- 60	88.1	93.0
73	A- 64	96.4	93.6
74	A- 67	71.4	110.
75	A- 70	77.4	86.3
76	A- 75	82.1	91.0
77	B- 49	98.8	97.8
78	B- 52	77.1	97.0
79	B- 54	66.3	103.
80	B- 55	81.9	108.

TABLE 1 Continued

<u>Final Items</u>	<u>Pretest Form and Item Number*</u>	<u>Item Difficulty**</u>	<u>Ratio of Black to White Difficulties**</u>
81	B- 56	72.3	91.9
82	B- 58	85.5	97.1
83	B- 59	85.5	98.0
84	B- 60	81.9	123.
85	B- 64	95.2	101.
86	B- 67	89.2	94.6
87	B- 68	89.2	89.6
88	A- 76	83.3	88.3
89	A- 78	89.3	90.4
90	A- 84	73.8	78.7
91	A- 77	85.7	83.2
92	A- 82	52.4	109.
93	A- 79	83.3	88.3
94	A- 88	64.3	91.3
95	A- 90	58.3	105.
96	A- 91	81.0	83.5
97	A- 93	38.1	115.
98	A- 94	77.4	91.9
99	A- 97	76.2	114.
100	A-101	82.1	85.9
101	B- 70	69.9	92.4
102	B- 72	73.5	83.2
103	B- 73	67.5	107.
104	B- 75	77.1	80.4
105	A- 95	54.8	89.5
106	B- 77	74.7	97.7
107	B- 83	67.5	107.
108	B- 84	83.1	82.7
109	B- 85	51.8	111.
110	B- 86	73.5	88.7
111	A-105	92.9	107.
112	A-110	82.1	91.0
113	A-111	84.5	90.6
114	A-113	77.4	97.7
115	A-114	76.2	101.
116	A-115	95.2	91.5
117	A-117	89.3	100.
118	A-118	90.5	92.2
119	B- 88	89.2	99.9
120	B- 89	75.9	100.
121	B- 94	89.1	93.0
122	B- 95	84.3	90.2
123	B- 96	92.8	91.6
124	B- 98	73.5	108.
125	B-101	83.1	98.6

*1 denotes Form 1 (Experimental Items)

A denotes Form A (Items 111-118 are Experimental Items)

B denotes Form B (Items 119-125 are Experimental Items)

**Cf. Appendix H

